

## **CHAPTER 3: ENVIRONMENTAL IMPACTS OF ALTERNATIVES**

### **3.0 INTRODUCTION**

A complete description of the affected environment and impacts of the Kittitas Valley Wind Power Project and No–Action alternatives were given in the KVVPP Draft EIS. A brief summary of the Project Action affected environment and impacts are given below for context in the discussion of the four off-site alternatives being considered. The information presented in this section is based on information provided by the Applicant in the ASC (Sagebrush Power Partners LLC, 2003a), presented in the Kittitas Valley Wind power Project Draft EIS (EFSEC, 2003), the Wild Horse Wind Power Project ASC submitted to EFSEC in March 2004 (Wind Ridge Power Partners, 2004), the Draft EIS developed by Kittitas County for the Desert Claim Wind Power Project (Kittitas County, 2004), the Wild Horse Wind Power Project Off-Site Alternatives Analysis (Jones and Stokes, 2004a); and the Wild Horse Wind Power Project Off-Site Alternatives Impact Analysis (Jones and Stokes, 2004b).

### **3.1 EARTH RESOURCES**

#### **3.1.1 Affected Environment**

##### **Kittitas Valley Wind Power Project**

The Kittitas Valley Wind Power Project site is north and east of the Yakima River on the Columbia Plateau. The project area is characterized by moderate topography with a network of streams and rivers that drain into the Yakima River. Local elevations range from approximately 2,200 to 3,100 feet. Slopes within the project area generally range from 9 to 36% and can reach 84% or more in some of the canyons.

The project site contains basaltic bedrock with shallow to moderately deep alluvium and glacial drift soils. The primary geologic hazard at the project site is earthquakes. The Uniform Building Code Seismic Risk Map of the United States shows that the Kittitas Valley site, along with all of eastern Washington and Eastern Oregon, is located in Seismic Zone 2B. An approximately 2.5-mile-long fault runs east-west through the project area, crossing U.S. 97 approximately 2,500 feet north of Bettas Road. This fault is not considered to be a significant seismic hazard. There is no potential landslide-prone terrain in the project area.

Within the State of Washington, the USGS recognizes five volcanoes as either active or potentially active: Mount Baker, Glacier Peak, Mount Rainier, Mount Adams, and Mount St. Helens. In the last 200 years, only Mount St. Helens has erupted more than once. The Kittitas Valley site is located in the zone of influence of the volcanoes listed above, and could be affected by ash fall if any of the local volcanoes erupted.

Mineral resources in the immediate vicinity of the site include active and inactive commercial and private rock quarries. In addition, the area is known for presence of the “Ellensburg Blue”, a rare type of agate classified by some gemologists as a precious gem. However, other areas in Kittitas County could potentially contain deposits of Ellensburg Blue.

### **Alternative 1: Swauk Valley Ranch**

The Swauk Valley Ranch site is north of the Yakima River on the Columbia Plateau. The project area is characterized by moderate topography with few streams, the largest of which drains into Swauk Creek and then to the Yakima River. Local elevations range from approximately 2,200 to 4,000 feet. Slopes within the project area generally range from 9 to 36% and can reach 84% or more in some of the canyons.

The project site contains basaltic bedrock with shallow to moderately deep alluvium and glacial drift soils. Potential geologic hazards at the project site include earthquakes and volcanic eruptions. The project site is also located in seismic Zone 2B earthquake hazard zone. The Swauk Valley Ranch site is located in the same zone of influence of volcanic eruptions as the KVVPP, and could be affected by ash fall if any of the local volcanoes erupted.

### **Alternative 2: Springwood Ranch**

The Springwood Ranch site is composed of terraced upland surfaces incised by the Yakima River, Taneum Creek, and several intermittent drainages. The Yakima River has eroded a relatively steep-walled canyon along most of the eastern limits of the property in the north and central portions of the site. Beneath the site, shallow bedrock consists of the Grande Ronde Basalt and the Ellensburg Formation. Most of the surficial soils on site range in thickness from about 0.5 to 6 feet. Mapped soil series at the site include Amabilis, Argixerolls, Kayak, Lablue, Maxhill, McDaniel, Metser, Millhouse, Nint, Qualla, Reelow, Reeser, Sketter, Swauk, and Weirman.

The Springwood Ranch site is located in an area of relatively low historical seismicity, also within seismic zone 2B, with no identified active surface faults or lineaments in the vicinity. Areas along the Yakima River, on the northeastern boundary of the site, have been designated as high erosion hazard and landslide hazard areas. Most of the traverse of Taneum Creek through the site is surrounded by soils with moderate erosion potential, and around the mouth of the creek, soils have been identified as having high erosion potential.

Evidence of past landslides has been observed along portions of the steep bluffs along the Yakima River. These areas generally occur within the outwash deposits and the Ellensburg Formation and are considered to have a high landslide potential. Areas with moderate to low landslide potential occur along the side slopes of on-site terraces, sections of the Yakima River Valley slopes, and slopes along Taneum Creek near the confluence with the Yakima River.

The Springwood Ranch site is also located in the same zone of influence of volcanic eruptions as the KVVPP, and could be affected by ash fall if any of the local volcanoes erupted.

### **Alternative 3: Wild Horse Wind Power Project**

Slopes on the Wild Horse site range from less than 5 and up to 40 degrees on Whiskey Dick Mountain and in side drainages. Streams on the site originate as springs that exist approximately between elevations 3,300 and 3,400 feet above mean sea level. Two streams flow southwest in

the direction of the Yakima River, while the remaining ephemeral and spring-fed streams flow primarily eastward from the Wild Horse site into the Columbia River.

Surficial materials consist primarily of a thin veneer of wind-deposited, brown, silty clay varying in thickness from a few inches to 3 feet. A thin alluvial deposit containing cobbles overlies bedrock in some locations. In general, soils on the Wild Horse site have a slow to moderate permeability resulting in a moderate to relatively high runoff potential. Relatively thin deposits of silt and clay (mainly wind derived) overlie basalt bedrock of the Miocene-age Grande Ronde Basalt flows. A localized outcrop of sedimentary rock, locally 16 to 33 feet thick, is mapped in the southeast portion of the Wild Horse area. A large landslide, estimated to be approximately 1/3 square mile in area and almost a mile long, is located in the vicinity of the Wild Horse site. The elevation ranges from approximately 3000 feet to 3700 feet over the length of the slide, with a corresponding average ground slope of approximately 2 horizontal to 1 vertical. Native vegetation at the surface throughout the slide area suggests that activity on the slide was either historical or is of a slow rate.

Geologic hazards that reasonably could be expected to occur at the Wild Horse site include seismic hazards generated from earthquakes, volcanic eruptions, erosion, and landslides. The Wild Horse site is located in an area of relatively low historical seismicity, also within seismic zone 2B. No faults are mapped within the project area for the Wild Horse site. Some inferred faults are mapped 4 miles southwest of the site, but there is no indication that these faults had been active in the late Quaternary. The closest earthquakes to the site were magnitude 3.3 and 3.4 events that occurred 7 and 9 miles from the site, respectively. The largest historical event was an estimated magnitude 7.0 earthquake that occurred in 1872, centered approximately 57 miles to the northwest in the Cascade Mountains. The Wild Horse site is also located in the same zone of influence of volcanic eruptions as the KVVPP, and could be affected by ash fall if any of the local volcanoes erupted.

Mineral resources in the immediate vicinity of the Wild Horse site include a small inactive borrow pit near the northwest corner of the site.

#### **Alternative 4: Desert Claim Wind Power Project**

The proposed location for the Desert Claim wind energy facility is on the western edge of the Columbia Plateau, approximately 50 miles east of the Cascade Range divide. The ridges and valleys in the region have a general northwest to southeast structural orientation as do the folds and faults in the bedrock. Evidence of erosion in the project area was observed along stream drainages, irrigation ditches, paved roads, and dirt roads. Three types of landslides commonly occur in the project vicinity, ranging from deep to shallow: earth slump; debris slump, or debris flow; and rock falls.

A large landslide (36 acres) has been identified in the northwest portion of the proposed site, although it is fully revegetated and represents an ancient event. This area possesses a large landslide risk particularly during a seismic event. The slide covers the eastern drainage wall of a Reecer creek tributary. Active erosion of the landslide toe will occur during high concentrated flows. Several small areas in the northwest and southeast portions of the site with steep slope gradients and high slopes have a moderate risk of rockfall and pose a moderate landslide hazard.

particularly during a seismic event. Most of the project area has moderate to low slopes with low landslide hazards. Overall, the risk of seismically induced landslides occurring on the site is interpreted to be low, except for localized areas along steep slopes where the risk is considered to be moderate.

The Desert Claim Project, like the KVVWPP, is located in a Seismic Zone 2B. Proximity of seismic activity discussed above for the KVVWPP is also representative for the Desert Claim site. There are inferred northwest-southeast trending faults that cross the project area, but recent activity along the faults has not been documented in post-Pliocene deposits. Although the project site is underlain by unconsolidated sediments up to 300 feet, it is likely that the potential for liquefaction on the site is low. Certain wetlands and stream corridors may be susceptible to liquefaction during larger seismic events. The Desert Claim site is located in the same zone of influence of volcanic eruptions as the KVVWPP, and could be affected by ash fall if any of the local volcanoes erupted.

### **3.1.2 Impacts of Proposed Action and Alternatives**

#### **Kittitas Valley Wind Power Project**

Project construction activities, including clearing, excavation, and filling, would result in soil impacts. The total amount of ground disturbance during construction would range from 231 acres to 371 acres. Total site disturbance and cut-and-fill activities in steep slope areas could result in significant erosion and some sliding of soil and alluvial materials. Soils and surface topography would not be altered after construction of the project is complete. Landscaping, grass, and other vegetative cover would prevent significant soil erosion during operation and maintenance of the project. A detailed Stormwater Pollution Prevention Plan (SWPPP) and site-specific Best Management Practices (BMPs) would minimize the potential for pollutant discharge and erosion from the project site during construction and operations. Imported fill materials would be required primarily for construction of access roads and turbine foundations. Between 232.5 and 259.9 cubic yards of fill would be required depending on the project scenario selected. Fill would be transported to the site from local gravel sources.

Development would have no influence on the level of seismic or volcanic hazard in the project area. A large earthquake in the project area could impact wind power operations, disrupt the regional electrical distribution system, damage wind power equipment, or cause collapse of the turbine towers. Project design and implementation of emergency plans would minimize these potential impacts and protect the public health and safety and environment in the project vicinity. Ash fall from a volcanic eruption could affect the operation of the facility. Project design and implementation of emergency plans would minimize these potential impacts and protect the public health and safety and environment in the project vicinity.

Decommissioning would consist of removing above-ground equipment such as wind turbines, meteorological towers, and their associated foundations to a depth of 3 feet below the ground surface. These activities would slightly alter topography and potentially cause minor erosion. Impacts to earth resources would be similar to those encountered during construction.

### **Alternative 1: Swauk Valley Ranch**

Project construction activities, including clearing, excavation, and filling, would result in soil impacts. Based on an estimated number of 42 turbines, the total amount of ground disturbance during construction is estimated to be approximately 97 acres of temporary impact, of which 53 acres would be permanently impacted. Total site disturbance and cut-and-fill activities in steep slope areas could result in significant erosion and some sliding of soil and alluvial materials. Soils and surface topography would not be altered after construction of the project is complete. Landscaping, grass, and other vegetative cover would prevent significant soil erosion during operation and maintenance of the project. A detailed SWPPP and site-specific BMPs would minimize the potential for pollutant discharge and erosion from the project site during construction and operations.

Given that the total number of turbines would only be one half to one third of the turbines planned for the KVVPP, and that the total length of access roads would also be approximately one half of the roads planned for the KVVPP, the total amount of fill that might be required for a project located on the Swauk Valley Ranch site would be approximately 115 thousand cubic yards.

Development would have no influence on the level of seismic or volcanic hazard in the project area. A large earthquake in the project area could impact wind power operations, disrupt the regional electrical distribution system, damage wind power equipment, or cause collapse of the turbine towers. A volcanic eruption from any of the five Washington volcanoes would contribute hazards from volcanic ash. Project design and implementation of emergency plans would minimize these potential impacts and protect the public health and safety and environment in the project vicinity.

Impacts of decommissioning would depend on the degree of facility removal that would be required. It is anticipated that these activities would slightly alter topography and potentially cause minor erosion. Impacts to earth resources would be similar to those encountered during construction.

### **Alternative 2: Springwood Ranch**

Project construction activities, including clearing, excavation, and filling, would result in soil impacts. Based on a siting number of 40 to 45 turbines, the total amount of ground disturbance during construction is estimated to be approximately 125 acres of temporary impact, of which 30 acres would be permanently impacted. Short-term erosion impacts would likely occur from clearing and grading activities during construction. During project operation, the risk of erosion would be similar to existing conditions on the site. Approximately 10 to 15 turbines could be located near areas of either high or moderate landslide potential. Setback and/or engineered protective measures would need to be required for these areas. Given the use of standard erosion control and stormwater management BMPs, erosion impacts would be localized, temporary, and insignificant.

Given the smaller number of turbines than proposed for the KVVPP, and the smaller project area, it is probable the amount of new access roads to be developed would also be smaller than

for the KVVPP. The resulting amount of required fill would therefore probably be half that required for the KVVPP. It is unknown if this amount of fill would be available on-site, or if it would have to be imported from elsewhere in the county.

Development would have no influence on the level of seismic or volcanic hazard in the project area. A large earthquake in the project area could impact wind power operations, disrupt the regional electrical distribution system, damage wind power equipment, or cause collapse of the turbine towers. A volcanic eruption from any of the five Washington volcanoes would contribute hazards from volcanic ash. Project design and implementation of emergency plans would minimize these potential impacts and protect the public health and safety and environment in the project vicinity.

Impacts of decommissioning would depend on the degree of facility removal that would be required. It is anticipated that these activities would slightly alter topography and potentially cause minor erosion.

### **Alternative 3: Wild Horse Wind Power Project**

Impacts on topography, geologic units, and soils from project construction would result from clearing, excavation and filling associated with constructing roads, establishing temporary crane pads and constructing the base for each turbine, and installation of underground and overhead electrical lines. Erosion would result from site disturbance and cut and fill activities. Total site disturbance would range from 289 acres to 401 acres.

Construction (cut and fill) of access roads in some areas could occur on or under relatively steep slopes, therefore, some sliding of soil and alluvial materials could be expected during construction. Most of the project facilities would not be located on unstable slopes or landslide-prone terrain. The turbines would be located on the tops of ridges, on relatively flat areas, and not on steep slopes. Therefore, sliding of near-surface soils and rock is unlikely in these areas.

Imported fill materials would be required primarily for construction of access roads and turbine foundations. Between 326 and 328 cubic yards of fill would be required depending on the project scenario selected. It is proposed that this fill be acquired from temporary on-site quarries.

Development would have no influence on the level of seismic or volcanic hazard in the project area. A large earthquake in the project area could impact wind power operations, disrupt the regional electrical distribution system, damage wind power equipment, or cause collapse of the turbine towers. A volcanic eruption from any of the five Washington volcanoes would contribute hazards from volcanic ash. Project design and implementation of emergency plans would minimize these potential impacts and protect the public health and safety and environment in the project vicinity.

No significant impacts on soils or topography are anticipated during project operation and maintenance.

Decommissioning would consist of removing above-ground equipment such as wind turbines, meteorological towers, and their associated foundations to a depth of 3 feet below the ground surface. These activities would slightly alter topography and potentially cause minor erosion. Impacts to earth resources would be similar to those encountered during construction.

#### **Alternative 4: Desert Claim Wind Power Project**

Short-term impacts to soils during project construction and decommissioning include clearing and grading, excavation, and fill for access roads, underground cable trenching, and turbine pads. Erosion could potentially result in increased sedimentation to surface water features, gully erosion, slope instability, and slope failures such as earth slumps, debris flows/slumps, and rock falls. The increased risk of erosion and landslides would be addressed by the following measures: BMPs such as sediment and erosion control measures; setbacks; micro-siting of turbines; and additional geological studies.

During project operation, the risk of erosion would be similar to existing conditions. However, impervious surfaces associated with the O&M building, substation, project access roads, and footings of turbines/transformers could increase runoff and pose a risk, especially on steep slopes. Potential soil loss and landslide impacts can be mitigated to acceptable levels during and after construction with proper implementation of BMPs and erosion control measures. Siting and design of project facilities such as turbines and buildings will consider existing seismic risks present in the area.

The proponent for the Desert Claim Project proposes that the amount of fill that would need to be imported be estimated after the type of selection of foundation is chosen for each turbine. Based on the fact that the Desert Claim Project proposes a similar number of turbines as the KVVPP, and an estimated requirement for 23 miles of access roads, it is likely that fill requirements would be similar to those for the KVVPP. Fill may be imported from off-site sources, if insufficient native materials are available.

Development would have no influence on the level of seismic or volcanic hazard in the project area. A large earthquake in the project area could impact wind power operations, disrupt the regional electrical distribution system, damage wind power equipment, or cause collapse of the turbine towers. A volcanic eruption from any of the five Washington volcanoes would contribute hazards from volcanic ash. Project design and implementation of emergency plans would minimize these potential impacts and protect the public health and safety and environment in the project vicinity.

Decommissioning would consist of removing above-ground equipment such as wind turbines, meteorological towers, and their associated foundations to a depth of 4 feet below the ground surface. These activities would slightly alter topography and potentially cause minor erosion. Impacts to earth resources would be similar to those encountered during construction.

## **3.2 VEGETATION, WETLANDS, WILDLIFE AND HABITAT, FISHERIES AND THREATENED AND ENDANGERED SPECIES**

### **3.2.1 Affected Environment**

#### **Kittitas Valley Wind Power Project**

##### *Vegetation and Wetlands*

Vegetation communities in the KVVPP project area are primarily sagebrush and grasslands consistent with the shrub-steppe region. However, there is a greater diversity of plant community types found at the Kittitas Valley site than those identified at the Wild Horse site. Lower elevations and a greater system of waterways allows for the development of riparian vegetation, conifer stands, and meadows. Lithosol communities occur commonly along the ridgetops located within the project area. These plant communities are principally composed of several different buckwheat species.

Based on wetland delineations conducted in April 2003, wetlands are rare and consist primarily of ephemeral areas within the riparian zones situated in ravines. Two wetland areas are potentially jurisdictional waters; one a flat seep drainage basin near Hayward Road and the other a stock pond that accepts high flows from Dry Creek. Although potential habitat exists within the project area for several special-status plant species, no rare plant species were identified in the project area. Many of the plant communities have been significantly modified as a result of cattle grazing, development activities, introduction of nonnative plant species, and natural disturbance factors such as lightning-caused wildfire. In many places cheatgrass and noxious weeds such as diffuse knapweed are common.

##### *Wildlife*

The Kittitas Valley site, along with the Swauk Valley and Springwood Ranch alternatives, is located closer to the east slope of the Cascades. The Kittitas Valley project area is composed of a series of ridges, primarily trending north-south, with both perennial and ephemeral streams flowing in valley bottoms between them and draining into the Yakima River. Wildlife habitat within this project area is primarily shrub-steppe, with riparian shrub and wetland plant communities occurring in riparian zones of streams and coniferous forest habitat occurring in patches on the site. Shrub-steppe and riparian habitat within the project area have been impacted by cattle grazing, and non-native invasive weed species are common.

A total of 97 avian species were identified within the project area. Abundant avian groups documented include passerines (American pipits, American robins, horned larks, western meadowlarks, swifts, swallows, warblers, vireos, chickadees, kinglets, and sparrows), woodpeckers (northern flicker, Lewis' woodpecker, and downy woodpecker), corvids (crows, ravens, and jays), and raptors (American kestrel, bald eagle, golden eagle, turkey vulture, northern goshawk; red-tailed, rough-legged, sharp-shinned, and Cooper's hawks; and great horned owl). Bald eagles, protected under the Endangered Species Act, are documented winter residents in the project vicinity, occurring primarily along the Yakima River, and regularly occur



in the project area. The level of use of this Kittitas Valley site by bald eagles is greater than that observed in the Wild Horse alternative site.

The Kittitas Valley site is located within the Pacific flyway. Because it is located closer to the Cascade mountains and the Yakima River it may have a higher incidence of use by migratory birds than the Wild Horse site.

Mammals observed in the project area included mule deer, elk, and American pika. Other mammals in the project area may include badger, coyote, pocket gopher, bobcat, rabbits, voles, and mice. Reptiles observed within the project area included rubber boa, Great Basin gopher snake, Northern Pacific rattlesnake, and short-horned lizard.

The Kittitas Valley site is located within winter range for deer and elk but does not contain any identified regularly used migration corridors for these species.

#### *Fisheries*

There are no fish-bearing aquatic resources located within the Kittitas Valley project area. There are 6 streams located within this project area and all are classified as Type 5 waters as defined under Washington's interim water typing system (WAC 222-16-031). Type 5 waters are considered non fish-bearing. The nearest fish-bearing aquatic resources are the Yakima River and Swauk Creek, both located more than 0.5 mile from the project area. Within the project area is a series of small, narrow stream channels and seeps with intermittent flow into the Yakima River. These resources do not provide habitat for resident or anadromous fish. The Yakima River is known to support priority fish species as defined by the WDFW as being federal or state threatened, endangered, or candidate species and species of concern. Priority species known to occur in the Yakima River include bull trout, chinook, interior redband trout, mountain sucker, pacific lamprey, steelhead, and westslope cutthroat trout.

### **Alternative 1: Swauk Valley Ranch**

#### *Vegetation and Wetlands*

The Swauk Valley site is in close proximity to both the Kittitas Valley site and the Springwood Ranch alternative site. Therefore, vegetation communities found on this site are very similar to those described for each of those sites. Vegetation in the northern portion of the site is a mosaic of Ponderosa pine, mixed conifer forest, shrub understory, and grasslands (WDFW, 2004). Although some agriculture and pasture occur near Bristol on the southwest portion of the site, vegetation communities in this area are primarily sagebrush and grasslands associated with the shrub-steppe region. Plant communities associated with lithosols commonly occur along ridgetops.

Kittitas County wetland maps identify nine wetlands on the site ranging from 0.25 acre to slightly more than three acres. Several streams and small lakes are also located on the site.

WDFW identified four sensitive plant communities on the east side of the site and adjacent to the unnamed perennial tributary to Swauk Creek—thyme buckwheat/Sandberg's bluegrass,

Ponderosa pine/common snowberry, Oregon oak/Geyer's sedge, and Suksdorf Monkey Flower (WDFW, 2004). Some plant communities at this site have been disturbed by the same human and natural disturbance mechanisms described for the KVVPP and the other alternative sites.

The Nature Conservancy of Washington holds a conservation easement on Lookout Mountain on the northern portion of the site.

### *Wildlife*

The Swauk Valley alternative is located to the north-northwest of and shares a common border with the Springwood Ranch alternative. As described for the Springwood Ranch alternative, baseline studies comparable to those reported for the KVVPP, Desert Claim and Wild Horse sites have not been conducted for the Swauk Valley Ranch site. Therefore detailed information on species occurrence comparable to that described for the KVVPP, and the Wild Horse and Desert Claim alternatives, is not available. In general, animals adapted to open grasslands, or the ecotone between forest and grasslands, would be expected to occur on the Swauk Valley Ranch site. The open, grass-dominated habitats that form the bulk of the south portion site limit its use by forest wildlife. Animals dependent on forest cover are found on the northern portion of the site, in the ponderosa pine and mixed forest.

WDFW identified approximately 220 acres of the northern portion of the site as western bluebird nesting habitat (a WDFW Monitor Species) and oak woodland as Priority Habitat. WDFW also indicated all of the site as mule deer/black-tailed deer habitat and the northern portion as elk habitat (WDFW, 2004).

The bald eagle is a relatively abundant winter resident of the Yakima River riparian corridor south and west of the site. Federally listed Species of Concern that could occur in suitable habitats on the site include the tailed frog, Columbia spotted frog, northern goshawk, western burrowing owl, olive-sided flycatcher, loggerhead shrike, Townsend's big eared bat, and five species of myotis bats. The sage grouse and northern sagebrush lizard may also occur on the site.

Merriam's shrew, ferruginous hawks, flammulated owls, pileated woodpeckers, Lewis' woodpeckers, white-headed woodpeckers, black-backed woodpeckers, striped whipsnake, Vaux's swift, sage thrasher, and sage sparrow could also occur in suitable habitats. Golden eagles possibly occur in small numbers in the area and could potentially nest on cliffs or in trees along the Yakima River.

Nine priority species potentially use suitable habitats on the Swauk Ranch site: sharp-tailed snakes, great blue herons, cavity nesting ducks, osprey, great gray owls, turkey vultures, western bluebirds, big brown bats, pallid bats, and Rocky Mountain mule deer. Western bluebirds and mule deer are known to occur on the northern portion of the site.

### *Fisheries*

The Swauk Valley Ranch site borders the north side of the Yakima River and Swauk Creek lies east of the site. There are no fish-bearing aquatic resources located within the project area. The

nearest fish-bearing aquatic resources are the Yakima River and Swauk Creek, both located 0.25 mile from the project area. Within the project area are located one unnamed perennial stream and series of small, narrow stream channels and seeps with intermittent flow into Swauk Creek and the Yakima River. These resources do not provide habitat for resident or anadromous fish. The project area includes several potential stream channel crossings.

In the vicinity of the Swauk Valley Ranch site, the Yakima River supports spring chinook salmon, steelhead trout, and bull trout. Resident rainbow and cutthroat trout are common to the area, and the eastern brook trout is likely present. Bull trout have been reported in the project area near the mouth of Swauk Creek. Other common species in the area include sculpin, mountain whitefish, and dace. Channel morphology in the Yakima River between Manastash and Swauk Creeks consists primarily of long runs with occasional deep pools. Large boulders provide some cover; however, large woody debris frequency is low. Overall cover protecting the river is rated as poor. Side-channels are present and offer off-channel rearing opportunities, but can dry up in the late summer and fall as flows drop. Rip-rap placed along the margins where the railroad approaches the river impairs habitat quality along the south shoreline. Spawning habitat is present, but the impact of high irrigation flows on summer habitat quality is considered to be a major problem for survival of juvenile steelhead.

The Columbia River district population segment of bull trout is listed as a threatened species under the Endangered Species Act. The mid-Columbia River evolutionarily significant unit of steelhead trout is listed as a threatened species. Bull trout and steelhead trout populations in the Yakima River are in this determination. The Swauk Valley Ranch area does not currently support any other known populations of fish species listed as endangered or threatened under the ESA. The WDFW Priority Habitat and Species (PHS) list (WDFW, 2004) includes the bull trout and steelhead trout as candidate species, and these are considered vulnerable to significant population declines.

## **Alternative 2: Springwood Ranch**

### *Vegetation and Wetlands*

The Springwood Ranch site is situated in the western portion of the Kittitas Valley in close proximity to the Kittitas Valley site. Like the Kittitas Valley site, this area is in the transition zone between open ponderosa pine forests of the Cascade Range's eastern slopes and the grass and shrub-steppe habitats to the east. The site is primarily grazed grasslands and agricultural lands. The agricultural lands occur along the Yakima River and extend onto the Kittitas Valley floor. Alfalfa and hay are the main crops on the site. Prominent plant communities on the site include coniferous and deciduous woodlands, grasslands and meadows, shrublands, wetland communities and riparian vegetation. Mixed stands of deciduous forest and shrub communities can be found at higher elevations on the bluffs above the Yakima River, along the draws extending from Thorp Prairie to the river, along Taneum and Swauk Creeks and along the steeper slopes adjacent to the Taneum Creek corridor. Open ponderosa pine woodlands and a few wet meadows occur in an area known as the Singing Hills.

The 1987 U.S. Fish and Wildlife Service National Wetland Inventory maps (USFWS, 1987) identify 20 wetlands on the Springwood Ranch site. These wetlands are found along the Yakima

River, Taneum Creek, the eastern and northern slopes of Thorp Prairie, and along the valley floor in the southeast portion of the property. Eighteen of the wetlands are less than 3 acres while two are greater than 8 acres. Seven of the on-site wetlands are located on the western portion of the site.

Although there is potential habitat on the site for some special-status plant species, PHS data did not indicate any records of threatened, endangered, or sensitive plant species on the site. No on-site survey to identify special-status plants has been conducted for this EIS. Noxious weeds such as chicory (*Cichorium intybus*) and spotted knapweed have invaded areas of the deciduous shrub communities that occur along the Yakima River and Taneum Creek.

### *Wildlife*

The Springwood Ranch alternative is located directly south-southeast of the Kittitas Valley site and is situated lower in the valley and extends onto the valley floor. This alternative is lower in elevation than both the KVVPP and Wild Horse alternative and has less extreme topographic relief. Grazed grasslands and agricultural land are the dominant vegetation/wildlife habitat types within the Springwood Ranch site, with alfalfa and hay being the primary crops, and with coniferous forest, deciduous forest, meadow, shrub, and wetland habitats also occurring.

Baseline studies have not been conducted for this site, therefore detailed information on species occurrence comparable to that described for the KVVPP, and the Wild Horse and Desert Claim alternatives is not available. A wide variety of bird species are likely to inhabit the Springwood Ranch site, however. Raptors that have been observed on the site include bald eagles, golden eagles, red-tailed hawks, rough-legged hawks, northern harriers, turkey vultures, American kestrels, owls (most likely short-eared), and falcons. Game bird species that have been observed include ring-necked pheasant, California quail, chukar, gray partridge, mallards, and green-winged teal. Crow, raven, black-billed magpie, meadowlarks, black birds, starlings, house sparrows and great blue herons were also determined to be present.

The Springwood Ranch site is likely host to several species of lizards, snakes, toads, frogs, and salamanders. Short-horned lizards, western skink, and western fence lizards could be found in most habitats on the site, while Northern alligator lizards may be found in the forests or forest openings habitat. Several garter snake species, ringneck snake, rubber boa, gopher snake, yellow-bellied racer, western rattlesnake and possibly sharp-tailed snake may also be found on site based on the habitats present. Amphibians require wetlands or aquatic habitats and would be far more limited than reptiles. Bullfrogs, spotted frog, western toad, Pacific tree frogs, and rough-skinned newts are likely the most common amphibians in the area.

A number of mammal species are likely to use the habitats found on the Springwood Ranch site. The Joe Watt/Robinson subherd of the Yakima elk herd can be found to the south of this area, and some elk activity has been detected along the Yakima River and the John Wayne Trail on the property. A small herd of deer was noted using the bluffs on the south side of the Yakima River, and the flats off the property on the east. Several species of bats are also likely to use the Springwood Ranch site.

## *Fisheries*

The Springwood Ranch alternative is located adjacent to the Yakima River and Taneum Creek crosses the site. The Yakima River supports spring chinook salmon runs, steelhead trout, and Pacific lamprey. Rainbow and cutthroat trout are common to the area. Eastern brook trout is likely present and bull trout have been reported within the project area near the mouth of Swauk Creek. Other common species in the area include sculpin, mountain whitefish, and dace. Spawning habitat is present, but the impact of high irrigation flows on summer habitat quality is considered to be a major problem for survival of juvenile steelhead.

Resident trout and anadromous fish species have historically used lower Taneum Creek for spawning and rearing. More recent surveys have found rainbow and cutthroat trout, eastern brook trout, steelhead and spring chinook salmon in the drainage. Spring chinook juveniles were observed in the drainage, indicating that spawning adults may be present. Lower Taneum Creek is contained in a low-gradient channel with good gravel and rubble available for spawning. In the past, upstream fish migration has been hindered by irrigation diversions. Water withdrawals have degraded habitat value in the lower basin by reducing the size of the stream, influencing water temperature and hindering upstream migration.

The Columbia River distinct population segment of bull trout is listed as a threatened species under the ESA. The mid-Columbia River evolutionarily significant unit of steelhead trout is listed as a threatened species. Bull trout and steelhead trout populations in the Yakima River are also listed as threatened. The Springwood Ranch area does not currently support any other known populations of fish species listed as endangered or threatened under the ESA.

### **Alternative 3: Wild Horse Wind Power Project**

#### *Vegetation and Wetlands*

The Wild Horse site is located within the general shrub-steppe region of central Washington. In an undisturbed condition, this area is usually distinguished by big sagebrush (*Artemisia tridentata*) as the principal shrub and bluebunch wheatgrass (*Agropyron [Pseudoroegneria] spicata*) as the principal grass. Approximately 10% of the site has been mapped as Grassland vegetation type. In addition to shrub steppe, lithosol and talus slopes are prevalent in the area, especially along the primary ridgeline of Whiskey Dick Mountain. These areas generally have sparse shrub cover, are found on exposed ridgetops and knolls and were dominated by low-growing bunchgrass, stiff sagebrush or various buckwheats. For the Wild Horse project studies, lithosol was mapped as a soil type as opposed to a vegetation type. Vegetation quality ranges from “fair” to “good” throughout the project area. The project area does contain some nonnative species and weedy species; however, native species overwhelmingly dominate the project area.

With regards to rare plant species (including federal and state listed species) potentially occurring in the Wild Horse area, only one plant species on the Washington State ‘Review’ list, hedgehog cactus, was found. Much of the suitable habitat present in the project area (lithosol habitats and sparse shrub-steppe) contained scattered individuals.

Field surveys indicated that no wetlands (as defined by the U.S. Army Corps of Engineers) occur in areas that would be occupied by the project facilities or a 164-foot (50 meter) buffer around each facility.

### *Wildlife*

Many of the bird species observed at the Wild Horse site are typical of shrub-steppe and grassland-steppe habitats. Small passerine species such as horned lark, western meadowlark, vesper sparrow, Brewer's sparrow, and sage thrasher were commonly observed on the site. Other small passerine bird species commonly observed were mountain bluebird and American robin. European starlings, graycrowned rosy finches and snow buntings (winter) were observed less frequently, but in large groups. Common ravens were also frequently observed on site. The most commonly observed raptors were redtailed hawk, American kestrel, golden eagle, and northern harrier, with infrequent or single observations of prairie falcon, sharp-shinned hawks, rough-legged hawk, merlin and bald eagle. Very few active raptor nests were observed within the project site, and no nests were found within ½ mile of proposed turbines. Sage grouse have historically been observed on the Wild Horse site during the spring and winter, although apparently no leks have been confirmed. Surveys conducted in 2003 did not confirm any lek activity.

Due to the dominant vegetation type and terrain, potential roost structures for bats, such as trees or talus slopes, are limited within the Wild Horse site. Trees exist near the "the Pines" area near Government Springs and within the riparian corridors along Whiskey Dick and Skookumchuck Creeks. The various springs within the area may be used as foraging and watering areas. There are some talus slopes and rocky outcrops scattered throughout the site that could also provide roosting opportunities for bats.

Little is known about bat species distribution, but several species of bats could occur based on the Washington GAP project and inventories conducted on the Hanford Site, Arid Lands Ecology Reserve (ALE) located in Benton County to the south. California bat, small-footed myotis, little brown bat, long-legged myotis, Yuma myotis, western pipistrelle, big brown bat, pallid bat, hoary bat, and silver-haired bat have all been documented by The Nature Conservancy on the nearby ALE Reserve. Both hoary bats and silver-haired bats, two common fatalities at other wind plants, are expected to migrate through the study area.

Other mammals that likely exist within the Wild Horse site include, badger, coyote, pocket gopher, Paiute ground squirrels and other small mammals such as rabbits, voles and mice. The Wild Horse site is located within habitats designated by WDFW as winter range for mule deer and elk, is located adjacent to the Quilomene migration corridor, and the northern boundary of the site is approximately ½ mile (0.80 km) from the Colockum elk calving area. The Quilomene elk winter range is approximately 83,000 acres in size and winters approximately 1500-2000 elk. The Quilomene mule deer winter range is approximately 40,000 acres in size and winters approximately 700-800 deer. The Wild Horse area is not located within the high-density deer sub-area of Quilomene mule deer winter range that typically supports 100-200 deer. This area begins approximately 1.5 miles (2.4 km) to the north east of the Wild Horse site, and extends to the east towards the Columbia River. The Wild Horse area is also not located within the

Quilomene primary elk winter range, a sub-area of the Quilomene winter range, which winters approximately 500 elk.

Wintering elk forage on native grass species such as Sandberg's bluegrass, which green up with fall and winter rains, while mule deer likely utilize more shrub species in the area. Wind-blown slopes and ridges remain snow-free most of the year. West and south-facing slopes green up earlier and provide accessible nutritious forage during the harsh winter months. Mule deer and elk also use the site during other seasons and some individuals are likely year-round residents. The riparian corridors of Whiskey Dick Creek provide some cover and the various developed and undeveloped springs provide a constant water source. Mule deer and elk hunting have historically been allowed on the Wild Horse site.

Twenty-seven species of reptiles and amphibians occur in Kittitas County and could potentially be present in the Wild Horse area depending on habitat preferences. Short-horned lizards were commonly observed within the project area. Other reptiles that may likely occur on the site include snakes such as the yellowbellied racer and rattlesnakes. Amphibian and aquatic reptile habitat is minimal within the area. Many amphibians migrate short distances during spring or fall breeding periods to and from suitable wetlands and during fall dispersal of juveniles; however, there are no known amphibian migration corridors in the area.

#### *Fisheries*

No fish occur in the Wild Horse Project area. The nearest fishery is located along Quilomene Creek approximately 1 mile (1.6 km) to the north of the site. The lower ends of Whiskey Dick, the North Fork of Whiskey Dick and Skookumchuck Creeks contain rainbow trout, and summer steelhead is identified along the lower end of Whiskey Dick Creek as well. These fisheries are more than 5 miles to the east of the project area for the Wild Horse Project site.

### **Alternative 4: Desert Claim Wind Power Project**

#### *Vegetation and Wetlands*

The Desert Claim site covers approximately 5,200 acres, of which nearly half is covered by shrub-steppe, primarily in the eastern and northern parcels. Grasslands are the second most common vegetation type, covering nearly a third of the site. There is also a small amount of irrigated agricultural land present. Approximately 200 acres are covered with lithosol associated plant communities.

Seventy-six wetlands were delineated as wetland features within the Desert Claim study area. Wet meadows are found scattered throughout the project area in drainages and swales, and along the North Branch Canal and around stock ponds. The riparian shrub type consists of riparian areas adjacent to perennial or intermittent streams or irrigation ditches where shrubs are common, but often scattered. Some riparian forest type and a small amount of pine forest occurs in the upper elevations of the northernmost portion of the site. Small areas of open water are scattered throughout the project area. In the project area, the wet meadows provide potential habitat for the federally listed Ute ladies'-tresses orchid, which was listed as a threatened species in 1992 (USFWS, 1992). No special-status plant species have been identified within this site.

Similar to the Wild Horse site, cheatgrass and knapweed are present but in general are not found over large areas. Some of the wetlands are hydrologically connected to perennial streams such as Reecer Creek and/or associated riparian corridors. However, none of the wetlands in the Desert Claim project area supports fisheries or other protected species.

### *Wildlife*

The Desert Claim alternative is also located within the Kittitas Valley, in close proximity to the Kittitas Valley site (1.6 miles east-southeast) and has similar topography to the Kittitas Valley site. Wildlife habitat within this project site is primarily shrub-steppe with grassland, agricultural lands, riparian shrub, riparian and upland forest, and wetland habitat also occurring.

Avian surveys conducted at this site found that passerines were the most abundant group on the site, followed by waterfowl, raptors, and corvids. The most common avian species observed over all seasons were European starling, American robin, mallard and western meadowlark. Bald eagles were observed in the project area. Several other species of raptors were also observed, including red-tailed hawk, rough-legged hawk, American kestrel, and northern harrier. Raptor nests were observed in the project area. As described for the KVVPP, wintering bald eagles occur in the vicinity of the Desert Claim alternative and have been observed within the project area, however foraging and roosting habitat is limited within the project area and most use is concentrated outside of the project area boundary. The level of use of this alternative by bald eagles is greater than that observed at the Wild Horse alternative site.

Like the KVVPP, the Desert Claim alternative is located within the Pacific flyway; however, it is located closer to the Cascade mountains and the Yakima River and so may have a higher incidence of use by migratory birds than the alternatives located in the more eastern portion of the County, such as the Wild Horse site.

Other species observed in the Desert Claim alternative site include short-horned lizard, coyote, porcupine, raccoon, long-tailed weasel, yellow-bellied marmot, least chipmunk, mule deer, and elk. The project area is located within winter range for mule deer. Use by elk appears to be low; however, a mapped elk migration corridor crosses the northern portion of the Desert Claim site.

### *Fisheries*

There are 19 streams located within the Desert Claim project area or in the immediate vicinity and 5 of the streams within the project area have been classified as Type 3 waters with the remainder being Type 4 or 5 waters, as defined under Washington's interim water typing system (WAC 222-16-031). Type 3 waters have a moderate to slight potential to support fish, while Type 4 and 5 waters are considered non fish-bearing. No fish bearing streams have been identified within the project area in either the WDFW PHS database or the Streamnet database; however, no survey information is available for this area.

Streams within the project area primarily drain into fish bearing streams, including streams that support fish species identified as priority species by the WDFW, which includes federal or state threatened, endangered, or candidate species and species of concern. Fish bearing waters downstream of the Desert Claim project site include Reecer and Currier Creeks and the Yakima



River. Reecer Creek is known to contain cutthroat trout, spring chinook, and summer steelhead. The Yakima River is known to contain spring chinook, summer steelhead, and bull trout.

The Columbia River distinct population segment of bull trout is listed as a threatened species under the ESA. The mid-Columbia River evolutionarily significant unit of steelhead trout is listed as a threatened species. Bull trout and steelhead trout populations in the Yakima River are also listed as threatened. The Desert Claim project area does not currently support any other known populations of fish species listed as endangered or threatened under the ESA.

### **3.2.2 Impacts of Proposed Action and Alternatives**

#### **Kittitas Valley Wind Power Project**

##### *Vegetation and Wetlands*

Construction impacts at the KVVPP site would cause a loss of approximately 93 to 118 acres of vegetation from construction activities. The majority of vegetation affected, from 311 to 371 acres, would be temporarily disturbed for up to 1 year. Grassland, shrub-steppe, sagebrush, deciduous shrub, riparian vegetation, and conifer forest communities would be cleared for project operations. Loss of 36–150 acres of sensitive lithosol habitat would be considered an adverse effect of the project. Grassland, shrub-steppe, and low sagebrush communities would be most affected by project disturbance. These areas would be replanted and restored after completion of construction activities. However, use of heavy equipment during the construction phase could cause soil compaction that may affect long-term plant survival and growth. Other potential impacts on vegetation include dust effects and increased potential for wildfires.

Up to 185 square feet of one wetland would be affected by filling or grading activities during construction. Potential impacts to vegetation are possible from the introduction, colonization, and spread of noxious weed species. Corresponding control measures would be required.

Impacts associated with project operations would include shading from the turbine towers, increased dust generated by travel on graveled roadways, potential changes in fire frequency patterns, and potential introduction of invasive weed species. No impacts on wetlands would occur during project operations if proper drainage, erosion-control plans, and stormwater management practices are implemented.

There would be no direct impacts on endangered plant species during the construction or operation and maintenance phases of the project.

##### *Wildlife*

Potential construction-related impacts include clearing and removal of vegetation, modification or loss of habitat, and construction noise. Habitat for upland game birds, passerines, hawks, small mammals, deer, elk, and reptiles would be impacted. Depending upon the scenario constructed, there would be 231 acres to 370 acres of temporary impacts to wildlife habitat and 93 to 118 acres of permanent impact to wildlife habitat under the Proposed Action.

Ground-dwelling mammals would be temporarily displaced by construction activities and would lose the use of permanently disturbed areas. Elk and mule deer would likely avoid the project area during periods of construction activity. Reptile species (striped whipsnake and sharp-tail snake) may be affected by loss of habitat and direct mortality in construction zones.

During project construction, the possibility of mortality effects to bald eagles is considered negligible and very unlikely to occur.

Operation and maintenance impacts on wildlife species may include disturbance and fatalities associated with vehicle traffic, avoidance of turbines, and collisions with turbines and meteorological towers. It is expected that passerines may experience between 50 and 300 fatalities per year. Raptors such as American kestrels and red-tailed hawks are estimated to have an average of 3 to 6 fatalities per year. It is likely that some bat fatalities would occur from collision with wind turbines. Bald eagle use of this site is higher than that observed at the Wild Horse site; however, the potential for bald eagle mortality is considered low because of use patterns within the site and a lack of habitat features in the immediate vicinity of the proposed turbines.

Individuals of some species such as white-tailed and black-tailed jackrabbits and Merriam's shrew could be killed by vehicular traffic. Development of roads and project facilities may lead to fragmentation of habitat for big game populations.

#### *Fisheries*

Potential impacts to fish [under??] the Kittitas Valley site would be limited to downstream impacts because there are no fish-bearing waters in the project area. Potential construction-related impacts to stream channels, water quality, and water quantity are expected to be short-term and negligible with proper management, including implementation of BMPs and other mitigation measures to control sedimentation and prevent water quality impacts that could potentially affect fish. Access roads associated with the project would cross and permanently disturb between 196 and 714 square feet in three stream channels; however, all in-stream work would be performed in accordance with a Hydraulic Project Approval (HPA) obtained for the project which would define requirements for erosion and sediment control and identify suitable work windows to minimize potential impacts. Adverse effects to downstream habitat, including the Yakima River, are not expected to occur as a result of the Proposed Action.

Operation of the project would have no adverse impacts on fish and fish habitat in the Yakima River downstream of the project site assuming proper drainage, erosion control, and stormwater management practices are implemented.

### **Alternative 1: Swauk Valley Ranch**

#### *Vegetation and Wetlands*

Estimated construction impacts would be similar to, but less than, those described for the Kittitas Valley site. Approximately 97 acres would be temporarily disturbed for up to 1 year. Habitats that would be most affected by the project include grassland, shrub-steppe, and low sagebrush

communities. Sensitive lithosol habitat would be potentially impacted in areas where shrub-steppe is disturbed. As with the project proposed at the Kittitas Valley site, these areas would be replanted and restored after completion of construction activities. Success of restoration efforts would depend on factors such as extent of soil compaction, extent of lithosols impacted, potential changes in fire frequency patterns, and the introduction of invasive plant species.

It is not known if there would be impacts to wetlands from construction. Micro-siting could reduce wetland impacts by placing project facilities outside wetland buffers. The project could potentially affect 17 acres of a thyme buckwheat/Sandberg's bluegrass plant community located adjacent to the south site boundary. As currently proposed, five wind turbines would be located within the designated sensitive area.

Impacts from operations and maintenance activities would be similar to those described for the Kittitas Valley site. No impacts on wetlands are anticipated during project operations if proper management practices are implemented.

#### *Wildlife*

Developing a wind plant on the Swauk Valley Ranch property would result in impacts on wildlife and habitat similar to those described for the Springwood Ranch Valley site. Given the close proximity of these sites and similarities in wildlife habitat between them, and assuming a project of similar magnitude was constructed, impacts would be expected to be similar. Since site-specific information for the Swauk Valley Ranch site is not available, however, potential impacts cannot be quantified.

#### *Fisheries*

Given the location of the Swauk Valley alternative in close proximity to Springwood Ranch and adjacent to the Yakima River, potential impacts of this alternative are likely to be similar to those described for the Springwood Ranch alternative.

### **Alternative 2: Springwood Ranch**

#### *Vegetation and Wetlands*

Impacts to vegetation communities at the Springwood Ranch site would be similar to, but less than, those described for the Kittitas Valley site and the other alternatives. It is estimated that approximately 30 acres of existing vegetation would be permanently displaced to accommodate wind energy facilities with an additional 110 acres temporarily disturbed for construction. Grasslands (generally used for grazing now) and shrublands would be the vegetation communities most affected by the project. Portions of woodland in the northwest corner of the site could possibly be affected by clearing for construction of project facilities. No other plant communities would be temporarily or permanently disturbed.

Construction of access roads and collection cable routes through or near wetland areas would be the two main activities affecting wetlands. Five wetlands lie in the northern and western portions of the site and would be subject to temporary disturbance by construction activity or

displacement by permanent project facilities. Micro-siting might be able to avoid some potential wetland impacts. The total area of potential wetland impacts has not been determined.

Based on current available information, no impact on federal or state threatened, endangered, or sensitive plant species would be expected to occur as a result of the project. All areas disturbed by the project are potential habitat for noxious and invasive species. Control measures would be implemented to prevent significant impacts.

Impacts from operation and maintenance activities would be similar to those described for the Kittitas Valley site.

### *Wildlife*

Wind plant construction could possibly affect birds through loss of habitat, disturbance and displacement effects due to human presence, noise, and potential fatalities from construction equipment. Disturbance effects would be expected to occur only if the construction activity took place near an active nest or a foraging area. If this was the case, breeding might be affected and foraging opportunities altered during the duration of construction.

Under this alternative it is estimated that there would be approximately 110 acres of temporary impact to vegetation and 28 to 30 acres of permanent impact to vegetation; therefore, this alternative would have less impact to wildlife habitat than the KVVPP, and both the Wild Horse and the Desert Claim alternatives.

Potential avian mortality has not been calculated for this alternative, and would be dependent upon the number of turbines built and the use of the area by avian species. Given the location of this site lower in the valley and closer to sources of water, fatality rates may not be comparable to either the Kittitas Valley, and the Desert Claim or the Wild Horse alternatives; however, baseline studies would be needed to determine this.

Given the assumed higher incidence of bald eagle use of this site due to proximity to the Yakima River and known winter use sites, the potential for bald eagle mortality under this alternative could be greater than described for the other alternatives.

Operation and maintenance activities could lead to avoidance of the area by mule deer; however, it is possible that they would become habituated to the turbines and continue to utilize the area. Development would have little direct impact on elk, as there is little use of the site by elk and the riparian areas along the Yakima River and Taneum Creek would be protected by existing regulations. Deer impacts would likely include disturbance and displacement impacts from construction activity.

Mortality of individuals associated with vehicular traffic may also occur.

### *Fisheries*

The Springwood Ranch alternative has a higher potential to impact fish than the KVVPP, and the Wild Horse and Desert Claim alternatives, and could have adverse affects on important fish

habitat and on Endangered, Threatened, Sensitive and Priority Species in both the Yakima River and Taneum Creek. Construction-related impacts, primarily delivery of sediment to streams, would most likely exist even though required shoreline setbacks would avoid construction disturbance close to the streams. Some of the turbine locations near the top of steep slopes above the Yakima River or Taneum Creek have been identified as high erosion and/or landslide hazard areas, posing a risk of sedimentation. These physical conditions represent localized concerns for potential impacts to fish and fish habitat from construction disturbance, and might warrant site-specific mitigation measures in addition to the standard BMPs.

### **Alternative 3: Wild Horse Wind Power Project**

#### *Vegetation and Wetlands*

Total temporary upland vegetation disturbance would range from 289.5 acres for the 104-Turbine/3 MW scenario to 401.4 acres for the 158-Turbine/1 MW scenario. Total permanent vegetation impacts would be very similar for all three turbine size scenarios (165 acres), with 0.12-acre difference between scenarios. No wetlands would be impacted as a result of the Proposed Action.

#### *Wildlife*

Potential mortality from construction equipment on site is expected to be quite low and similar to other recent wind projects. Operation and maintenance impacts on wildlife species may include disturbance and fatalities associated with vehicle traffic, avoidance of turbines, and collisions with turbines and meteorological towers. It is expected that passerines, including western meadowlark, vesper sparrow and horned lark, may experience between 50 and 300 fatalities per year. Raptors such as American kestrels and red-tailed hawks are estimated to have an average of 3-6 fatalities per year. It is likely that some bat fatalities would occur from collision with wind turbines. A low risk potential exists for bald eagle fatalities during project operation. Some white-tailed and black-tailed jackrabbits and Merriam's shrew could be killed by vehicular traffic. Development of roads and project facilities may lead to fragmentation of habitat for big game populations. No disturbance or displacement impacts to raptor nests are anticipated, since no active raptor nests were identified within ½ mile (0.80km) of the proposed facilities. No impacts to federally-listed endangered or threatened species are anticipated.

Impacts on mammals from project operations are expected to be very low and not significant. Some mortality of migratory bats, in particular hoary and silver-haired bats, is anticipated during operation.

Construction impacts to reptiles and amphibians on site would be loss of habitat and direct mortality of some individuals occurring in construction zones. Operation impacts would be limited. Temporary loss of big game habitat from project construction is considered a minor impact due to vegetation reclamation and the vast expanse of suitable habitat for mule deer in the region. Once construction is complete, it is expected that deer would become habituated to wind turbines and again occupy areas on-site. Elk could shift their path to the north without migratory hindrance due to the large size of the corridor.

## **Fisheries**

No streams or riparian areas would be directly impacted from construction disturbances related to wind turbines and roads. All Project facilities would be located a considerable distance from streams and riparian areas.

Precipitation during construction could result in sediment-laden surface runoff from disturbed areas that could adversely affect nearby surface waters.

The quantity and quality of stormwater runoff could be affected by operation of the proposed project because of the increase in impervious surfaces, which could result in impacts on fisheries habitats downstream of the project area, if not mitigated.

Impacts on fish and fish habitat from decommissioning the proposed project would be similar to Project construction. Dismantling the project would reduce the quantity of impervious surfaces in the Project area. No impacts from decommissioning are anticipated due to the absence of potential fish habitat in the proposed project area.

## **Alternative 4: Desert Claim Wind Power Project**

### *Vegetation and Wetlands*

Approximately 78 acres of existing vegetation would be permanently removed for project facilities at the Desert Claim site. Permanent loss of vegetation would occur in shrub-steppe, grassland, riparian shrub, riparian forest, and wet meadow habitats. The majority of construction impact, over 90%, would occur in shrub-steppe and grassland. Approximately 3 acres of land currently used for agricultural purposes would also be permanently converted to land occupied by the project facility. In addition, 311 acres of vegetation would be temporarily disturbed.

Approximately 9 acres of wetland area would be permanently displaced by project facilities, with an additional 16 acres temporarily disturbed by construction. No impacts to special-status plant species are anticipated. Similar to the KVVPP site, all areas disturbed by project construction would be vulnerable to invasion by nonnative or noxious weed species. Control measures similar to those described for the KVVPP would be implemented.

Impacts associated with operation and maintenance activities would be similar those described for the KVVPP site.

### *Wildlife*

Construction related impacts to wildlife habitat would be similar to those described for the Kittitas Valley site with an estimated 311 acres of temporary impacts and 78 acres of permanent impacts to vegetation on the site. Construction activities could temporarily displace species from the project area due to noise and activity, and ground-dwelling species would be permanently displaced from those areas of permanent impact. Construction activities could cause mule deer to avoid the project area; however, adequate habitat in the surrounding area would compensate for this. Elk may respond to project construction by shifting their migratory path to the north;

the corridor is likely large enough to accommodate this adjustment without hindering their migration. During project construction, the possibility of mortality effects to bald eagles is considered negligible and very unlikely to occur.

Operation and maintenance impacts would also be similar as those described for the Kittitas Valley site. Potential passerine mortality for this alternative has been estimated at approximately 140 to 220 birds per year and raptor fatalities have been estimated at approximately 3 to 4 per year. The potential for bald eagle mortality is low based on limited use of the site.

Project operations may reduce use of the area by wintering mule deer, although it is expected that mule deer would become habituated to the turbines and reoccupy the site. Elk may also become habituated or may continue to use areas further to the north during migration.

Individuals of some species may also be killed by vehicular traffic.

#### *Fisheries*

Because none of the streams in the Desert Claim project area are known to contain fish, potential impacts to fish are expected to be limited to downstream impacts, similar to the Kittitas Valley site. This alternative may have a slightly higher potential for impacts, however, due to the presence of Type 3 waters on the site, although these waters are not known to contain fish. As described for the Kittitas Valley site and the Wild Horse alternative, BMPs and other mitigation measures to control sedimentation during both project construction and operations are expected to prevent water quality impacts that could potentially affect fish downstream of the project area.

### **3.3 WATER RESOURCES**

#### **3.3.1 Affected Environment**

##### **Kittitas Valley Wind Power Project**

The project site is located within the Yakima River drainage basin. Portions of the project are within approximately 0.5 mile of the Yakima River, Dry Creek (an ephemeral creek), other unnamed ephemeral creeks, the North Branch Canal of the Kittitas Reclamation District, and livestock watering ponds. Groundwater in the project area has domestic, irrigation, and other uses. The closest floodplain to the project site is the 100-year floodplain of the Yakima River, and the closest access road or turbine is more than 500 feet in elevation above the level of the river.

##### **Alternative 1: Swauk Valley Ranch**

The project site is located within the Yakima River drainage basin. The south boundary of the project is within approximately 0.5 mile of the Yakima River. An unnamed perennial stream, a tributary to the Swauk Creek, bisects the eastern portion of the site. No other perennial streams are located within the site.

Groundwater in the project area has domestic, irrigation, and other uses. The closest floodplain to the project site is the 100-year floodplain of the Yakima River. Information on ground water well yields has not been collected as part of this analysis.

##### **Alternative 2: Springwood Ranch**

The Yakima River bounds the Springwood Ranch site along most of its north and east sides. Taneum Creek intersects the northern and southern portions of the site. An intermittent stream with two branches crosses the northern portion of the site and empties into the Yakima River, and another intermittent stream drains from the middle of the site and flows into the Yakima River. Two irrigation canals cross the northwestern portion of the site, and two ponds are located just to the west of the northwest corner of the site.

The Yakima River (downstream of the Springwood Ranch) is listed by Washington Department of Ecology (Ecology, 2004) as impaired for fish rearing, harvesting, spawning and migration as a result of agricultural activities, habitat modification, and removal of vegetation. Taneum Creek is listed by Ecology as limited for instream flows and temperature.

Three major aquifers are present beneath the Springwood Ranch site and surrounding areas, and are characteristic of the hydrology of the Wild Horse and Desert Claim sites. Ground water wells in the Ellensburg formation produce relatively low (5-15 gpm) groundwater yields, whereas wells near the site in the Grande Ronde Basalt formation range from less than 20 gpm to 700 gpm. Wells near the site are used for domestic single-family residences. Other wells near the site are used for municipal or irrigation water supply.

##### **Alternative 3: Wild Horse Wind Power Project**



Surface water on the Wild Horse site is characterized by the presence of several small intermittent creeks and their tributaries, springs, stock watering ponds, and other unnamed ephemeral creeks. These include Whiskey Dick, Skookumchuck, and Whiskey Jim Creeks; and Wild Horse, Skookumchuck Heights, Dorse, Reynolds, Thorn, Government, Pine, and Seabrock Springs. Most project facilities would be located on exposed ridge tops away from surface waters.

Whiskey Dick, Skookumchuck, and Whiskey Jim Creeks all originate within the proposed project boundary, at an elevation of approximately 3,400 feet. Whiskey Dick and Skookumchuck Creeks flow east and southeast to an elevation of about 700 feet at their mouths at the Columbia River. The creeks collect water from surface runoff, springs, and seeps. In the project area, these channels are narrow, shallow systems with intermittent flows. The creeks transition from intermittent flow in their upper elevations to perennial flow (downstream of the project) as they pick up flow from runoff, springs, and seeps on the descent to lower elevations.

Wild Horse, Skookumchuck Heights, Dorse, Reynolds, Thorn, Government, Pine, and Seabrock Springs are mapped in the project area. The observed flow rates were found to be in the range of 1 to 5 gallons per minute. The majority of these springs exist between elevations of 3,300 and 3,400 feet in the project area. Because of the relatively short distance from the top of the ridges down to the location of the springs, the recharge area is relatively small, and it is anticipated that spring flow would decrease later in the summer and fall.

The Wild Horse site is also located within the Yakima Fold Belt subprovince of the Columbia Plateau physiographic province. Numerous hydrologic units exist within the complex geology of the Yakima Fold Belt and the greater Columbia Plateau aquifer system. To simplify the description of the area's hydrogeology, the aquifers in the vicinity of the Wild Horse site have been grouped into two main hydrologic units: the overburden and the basalt aquifers.

The overburden in the structural basins of the Columbia Plateau physiographic province readily transmits water and comprises water table aquifers. These aquifers are generally coarse-grained and highly permeable in their upper sections and fine-grained and less permeable at depth. Where the overburden is thick, such as in the structural basins in the Yakima Fold Belt, extensive coarse-grained layers exist deeper in the section and function as water-producing zones. Groundwater movement in the overburden is downward from the anticlinal ridges toward the streams and rivers (i.e., Columbia and Yakima Rivers) in the intervening synclinal basins. The water-level contours for the overburden aquifer roughly parallel the land surface. Recharge is mainly from infiltration of applied irrigation water and from precipitation, with precipitation the predominant source of recharge. Discharge is to rivers, lakes, drains and waterways and the underlying basalt unit. Downward movement of water to the basalts is controlled by intervening fine-grained sedimentary layers and by head difference between the units.

Groundwater in the basalts occurs in joints, vesicles, fractures, and in intergranulated pores of the intercalated sedimentary interbeds. The basalt forms an extremely complex heterogeneous aquifer system with interflow zones that potentially function as small semiconfined to confined aquifers. Deeper basalt units are generally confined. However, because the hydraulic connection between units is sufficient to allow continuous vertical movement of water between them, the

confined units are referred to as being semiconfined. Water-level data indicate that over most of the plateau, the vertical component of regional flow in basalts is downward except near discharge areas, located generally along streams and rivers. Localized anomalies to this pattern are caused primarily by geologic structures of both known and uncertain nature and secondarily by groundwater pumping and irrigation. Similar to the overburden aquifer, groundwater movement in the basalt aquifers of the Yakima Fold Belt is from the anticlinal ridges toward the streams and rivers (i.e., Yakima River) in the intervening synclinal basins.

Groundwater in the basalt aquifer system is generally suitable for most uses. However, groundwater has not yet been exploited for beneficial use via drilled wells within the Wild Horse area (Ecology, 2003). The groundwater wells mapped in the area are at least 2 miles from the site boundary, and at least 1,000 feet lower in elevation. Groundwater is vigorously used in the surrounding areas for domestic, irrigation, and other agricultural purposes, especially in the Kittitas Valley to the west.

#### **Alternative 4: Desert Claim Wind Power Project**

There are 19 streams within the Desert Claim project area and the immediate vicinity characterized as having perennial or intermittent flow. From west to east, the following named streams bisect the project area: Green Canyon (perennial); Reecer Creek (perennial); Robbins Canyon (intermittent); Jones Creek (intermittent tributary to Currier Creek); and Currier Creek (intermittent). Reecer Creek was identified as the highest-quality stream in the project area, with sustained flow throughout the year and riparian habitats along most of the channel. It drains to the Yakima River west of Ellensburg and about 6 miles south of the project area.

Grande Ronde Basalt, Ellensburg Formation sandstone, and undifferentiated alluvial and glacial deposits also comprise the three main aquifer systems beneath the Desert Claim site and immediate surrounding areas. The Grande Ronde Basalt and Ellensburg Formation aquifers are generally characterized as relatively deep, confined to semi-confined aquifers. The undifferentiated alluvial/glacial aquifer is shallower and is interpreted to exhibit semi-confined to unconfined aquifer conditions.

The Desert Claim project area is located on the northern edge of the Ellensburg Basin. Kittitas Drift and Quaternary-age alluvial material dominate the near-surface geology but pinch out to the north where Grande Ronde Basalt crops out. A review of area well logs reveals that most wells are producing water from fractures, and flow from top and bottom aquifers in Grande Ronde Basalt or Ellensburg Formation sandstones.

Recharge to the alluvial aquifers is provided by infiltration of runoff from surrounding bedrock ridges, streamflow, direct precipitation, and leakage from irrigation sources (including ponds and the North Branch Canal). Regional ground water flow in the alluvial aquifers of Kittitas Valley generally corresponds to the topography, eventually flowing down the Yakima River Valley. Ground water flowing in the alluvial aquifer is interpreted to discharge primarily into the Yakima River, streams, irrigation lakes and the North Branch Canal, and underlying bedrock.

Recharge to bedrock aquifers is provided by overlying alluvial aquifers, flow from other bedrock aquifers, and direct precipitation. The up-folded limbs of Grande Ronde Basalt and Ellensburg

Formation that crop out north of the project area also receive water from direct precipitation and stream flow. Ground water flow in the bedrock aquifers is typically controlled by the orientation of structures such as folds and fractures, and the physical characteristics and orientation of the individual stratigraphic layers. Water flowing in the various bedrock aquifers likely discharges to other bedrock aquifers (both shallower and deeper), overlying alluvial aquifers, and surface water.

Large well yields are common in the Ellensburg area. Unconsolidated deposits in the Ellensburg Basin of Kittitas Valley are up to 1,000 feet thick and yield up to 3,200 gallons per minute (gpm) to wells for public supply, domestic, commercial, and agricultural (primarily irrigation) purposes. Closest to the Desert Claim site, wells are located surrounding and within (4 wells) the project area for a total of 166 wells, over 92 square miles. Five wells are used for irrigation purposes and the remaining wells are for single-family domestic use (according to well logs and water rights claims).

A study of the hydrology of Kittitas Valley and a review of well logs for this study indicate that well yields average 20 to 23 gpm in the Desert Claim project vicinity (Owens, 1995). The study concludes that ground water yield and flow in the Kittitas Valley is largely dependent on stratigraphic and structural controls and high well yields do not necessarily correlate to depth although on average yield increases with depth. All of the homes in the area use on-site septic systems to discharge waste water; therefore, a large portion of the water used is returned to the shallow subsurface. Water rights data obtained from Ecology indicate that irrigation in the project vicinity uses substantially more ground water than single-family residences. Approximately 350,000 gpd of water is used for irrigation (estimated from Ecology data).

### **3.3.2 Impacts of Proposed Action and Alternatives**

#### **Kittitas Valley Wind Power Project**

Impacts during construction could include sediment-laden surface runoff from ground disturbance and exposed soils. If not properly mitigated, runoff from disturbed areas could adversely affect nearby surface waters. Impacts to existing ground water wells due to blasting for construction of turbine foundations is expected to be unlikely, because of the significant difference between the depth of existing water wells (57 to more than 720 feet, with most around 150 feet), and the comparatively much shallower turbine foundation depth.

Construction of the project would require delivery of water to the site for road construction, concrete preparation, dust control, and other activities. Estimated water use for construction related needs is 1 million gallons, with up to 6.4 million gallons required for dust suppression on access roads and roadways. Construction water would be imported from certificated off-site sources. Construction activities would not result in any adverse impacts on local groundwater. The overall impact on groundwater in the project area is expected to be temporary and unlikely to affect water wells.

Project O&M would result in no significant erosion or sedimentation impacts on local surface waters. Operation of the project would require a domestic well to serve the limited needs (less

than 1000 gallons per day) of the O&M facility. No significant impacts on groundwater supplies are expected because of facility operations.

Because of the far removed location of the Kittitas Valley Site from floodplains, no impacts to flood plains from construction or operation are anticipated.

Impacts on water resources from decommissioning of the project would be similar to those described for construction. Appropriate construction BMPs followed during decommissioning activities would further minimize impacts.

### **Alternative 1: Swauk Valley Ranch**

Impacts during construction could include sediment-laden surface runoff from ground disturbance and exposed soils. If not properly mitigated, runoff from disturbed areas could adversely affect nearby surface waters. Construction of the project would require delivery of water to the site for road construction, concrete preparation, dust control, and other activities. Construction activities would not result in any adverse impacts on local groundwater. The amount of water required would depend on the number of turbines and other facilities constructed, and the total length of access roads. Given that the hypothetical Swauk Valley Ranch Project is smaller than the KVVPP, the construction water needs would likely be less than those for the KVVPP. The overall impact on groundwater in the project area is expected to be temporary and unlikely to affect water wells.

Project O&M would result in no significant erosion or sedimentation impacts on local surface waters. Operation of the project would require a domestic well to serve the limited needs of the O&M facility. No significant impacts on groundwater supplies are expected because of facility operations.

Impacts on water resources from decommissioning of the project would be similar to those described for construction. Appropriate construction BMPs followed during decommissioning activities would further minimize impacts.

### **Alternative 2: Springwood Ranch**

Impacts during construction could include sediment-laden surface runoff from ground disturbance and exposed soils. If not properly mitigated, runoff from disturbed areas could adversely affect nearby surface waters. In particular, six to eight of the presumed turbine locations (and their associated access roads) would be within approximately one-quarter mile of the Yakima River, near slopes marked with high erosion and landslide potential. Additional site specific mitigation measures would be warranted in this location of the project site. Site construction would have minimal impacts on groundwater. Runoff from disturbed areas would be infiltrated on site, resulting in a minor temporary increase in groundwater recharge.

No analysis has been performed to determine the source or volume of water required during construction activities.

Operation of a wind energy project would have minimal influence on existing surface water runoff patterns for Springwood Ranch. Therefore, long-term operation would not result in significant impacts on surface water resources. Operation of the project would likely have minimal long-term impacts on groundwater. Impervious surfaces associated with turbines, roads, and buildings would result in a minor increase in surface runoff volume, some of which could translate into a minor increase in groundwater recharge. Water demands for project operation would likely be filled through construction of a domestic well and would have no impact on groundwater supply.

Impacts on water resources from decommissioning of the project would be similar to those described for construction. Appropriate construction BMPs followed during decommissioning activities would further minimize impacts.

### **Alternative 3: Wild Horse Wind Power Project**

Precipitation during construction could result in sediment-laden surface runoff from disturbed areas that could adversely affect nearby surface waters.

Construction of the project would require delivery of water to the site for road construction, concrete preparation, dust control, and other activities. Estimated water use for construction and dust suppression related needs is approximately 10.7 million gallons. Construction water would be imported from certificated off-site sources.

Encountering significant amounts of groundwater during construction and blasting activities is not expected. The overall impact is expected to be temporary and unlikely to affect wells in the project area.

No significant erosion or sedimentation impacts on surface waters are expected as a result of operation and maintenance of the Project.

Water needs would be limited to bathroom and kitchen use and general maintenance purposes, and is expected to consume less than 1,000 gallons/day. Water for these purposes would be imported from off-site sources.

Potential impacts on water resources from decommissioning the proposed project would be similar to project construction.

### **Alternative 4: Desert Claim Wind Power Project**

Turbine construction would affect six stream segments and temporarily disturb a total of 3.5 acres of stream and riparian area. Permanent impacts include tower foundations occupying 0.3 acre of riparian habitat and proposed access roads that cross 15 streams (eight would be crossed twice). The underground power-collection system would entail crossing 17 streams, each several times. The project would not require surface water withdrawals or diversions during construction or operation; impacts on surface water quantity and quality are expected to be minor and temporary. BMPs will be used during construction to address water quality impacts. The

volume of water required during construction for dust suppression and construction operations was not quantified.

Impervious surfaces associated with the project are limited and are not expected to impact ground water recharge. As indicated above for the KVVWPP, impacts to existing ground water wells due to blasting activities for turbine foundation construction are not expected.

Water supply for operation and maintenance (mainly at the project's O&M facility) would likely be provided through development of a domestic well on a participating landowner's property with withdrawals less than 5000 gallons per day. Septic waste from the O&M facility would be routed to an on-site septic system constructed according to state and local government requirements.

Impacts on surface water and ground water during operation of the facility would therefore be minimal.

Impacts on water resources from decommissioning of the project would be similar to those described for construction. Appropriate construction BMPs followed during decommissioning activities would further minimize impacts.

## **3.4 HEALTH AND SAFETY**

### **3.4.1 Affected Environment**

Existing conditions and uses associated with projects at the four alternative off-site locations include identifiable mechanical and electromechanical hazards, associated with everyday living, working and traveling in a rural area.

Existing electrical transmission lines create the potential for electrical safety hazards in the immediate vicinity of the lines and the potential for personal injury, property damage, or fire in the event of transmission line failure or tower/pole collapse.

All off-site locations are generally arid rangeland with a predominant groundcover of grasses and sagebrush. Fire is a primary health and safety risk at these sites, especially during the hot, dry summer season. Fires could be started by lightning strike or by human activities. Kittitas County in general is located in an area with low lightning flash density (EFSEC, 2003).

Additional existing conditions are described below for each of the off-site alternatives.

#### **3.4.1.1 Kittitas Valley Wind Power Project**

Two state highways, two county roads, and several private roads traverse the project area. Approximately 60 dwellings have been identified within one mile of the proposed project, the closest being located in the northeastern portion of the project area, within 790 feet of the nearest proposed wind turbine.

The project site is currently traversed by multiple sets of electrical transmission lines running east-west across the project site: one set of PSE lines and five sets of Bonneville lines.

#### **Alternative 1: Swauk Valley Ranch**

Major roadways in the area include SR 970, SR 10, and I90. Several roads maintained by Kittitas County, as well as private roads, are located in the project area. A series of rough access roads cross the site.

A detailed analysis of the number of residents in the vicinity of the Swauk Valley Ranch project area has not been performed. Based on U.S. Census Bureau population estimates (2001) for Kittitas County, 8 to 79 people per square mile could currently reside in vicinity of the Swauk Valley Project area. There are an estimated 60 residential structures within 1 mile of the proposed wind turbine strings. It is estimated that the residents would be concentrated along the river and to the south of the proposed site, as close as one quarter mile to the hypothetical turbine layout.

A Bonneville transmission line crosses through the center of the site in an east-west direction.

## **Alternative 2: Springwood Ranch**

The local road network surrounding the Springwood Ranch area consists of interstate highway I-90, State Route 10, and several county roads. Traffic from I-90 and surrounding roadways creates the potential for impacts between vehicles, as well as for vehicles to impact people and structures.

Existing electrical facilities within the Springwood Ranch site include low-voltage electrical distribution lines serving rural residences. The Bonneville transmission corridor with multiple lines passes approximately 2 miles to the north of this site.

The Springwood Ranch site is in a rural area with a low population density which includes scattered developed sites near Taneum Creek (to the south); nearby residences (to the east) along the Thorp Highway, and school and residential uses within the nearby community of Thorp. The Sunlight Waters residential/recreational community near the northwest corner of the site presents some residences that could be located within 500 feet of the hypothetical placement of a turbine.

## **Alternative 3: Wild Horse Wind Power Project**

The proposed project would be built on open ridge tops on a predominantly shrub-steppe 8,600-acre rangeland site between the cities of Kittitas and Vantage. The site boundary is located approximately 2 miles north of Vantage Highway and 11 miles east of the City of Kittitas. Access to the project site is via an existing private gravel road that branches from Vantage Highway at a location approximately 11 miles east of the City of Kittitas. The Site is crisscrossed by a system of private gravel roads.

The nearest residence to the project is approximately 1.75 miles to the south near Vantage Highway. The nearest residence to the transmission line that would connect to the existing Puget Sound Energy Inter-Mountain Power line is approximately 0.25 mile from the proposed line. The nearest residence to the transmission line that would connect to the existing Bonneville Power Administration Columbia to Covington 230 kilovolt line or the Grand Coulee to Olympia 287 kV line is approximately 0.5 mile from the proposed line.

The project boundaries are not within an existing fire district. The Rural Ellensburg and Vantage Fire Districts are nearby to the west and east, respectively. A portion of the transmission line that would connect to PSE's Inter-Mountain Power line is within the Rural Ellensburg Fire District.

## **Alternative 4: Desert Claim Wind Power Project**

The Desert Claim Project area is served by a discontinuous system of two-lane county roads. Additional local land uses are accessed via dirt or gravel private roads that intersect the county road system.

An estimated 83 residences lie within one-half mile of the project boundary. Of these, 31 occupied residences (and one abandoned trailer shown as a residence) are located within the



project area, or within 1,000 feet of the project boundary. Approximately 8 residences are located within the boundary of the project area. The Sun East Community lies within less than 1 mile north and east of the project area, and consists of 170 lots with 22 year round residents and a number of seasonal cabins.

Eight high voltage transmission lines either directly cross or are adjacent to the project area, with six owned and operated by Bonneville and, two owned and operated by PSE.

### **3.4.2 Impacts of Proposed Action and Alternatives**

Several impacts are common to all off-site alternatives. Construction-related risks include unintentional or accidental fire or explosion during project construction, especially during the hot, dry summer season. Unintentional or accidental fire or explosion risks during project operations and maintenance include human activities, such as cigarette smoking; use of vehicles off established roadways; and mechanical malfunction inside the WTGs and at other project facilities. Lightning-induced fires are rare in the project area. The wind turbines would be equipped with lightning protection systems to reduce the risk of lightning-induced fires.

Potential sources of hazardous materials include fuel and oils from construction equipment and mineral oil used to fill substation transformers during project operations. Periodic changing of lubricating oils and hydraulic fluids used in the individual turbines would result in the generation of small quantities of hazardous waste. Spills would be addressed in accordance with a project Spill Prevention Control and Countermeasures (SPCC) Plan.

Potential safety risks during project operations include ice falling off of rotating turbine blades, blade throw (blade fragments thrown from a rotating turbine), and potential collapse of turbine towers. The collapse of a turbine tower constructed in accordance with international standards and local building codes is highly unlikely, as is the potential for ice or blade fragment throw. There is a possibility of ice throw, but studies have shown that no ice fragments have been thrown distances of more than 100 meters. The level of impact to the public will depend on the number of residences in close proximity to the project area, and the proximity, and level of use, of private and public roads. Establishing exclusion zones or setbacks around turbines can adequately mitigate for these hazards.

Substations and other electrical facilities would be designed and constructed with systems that would protect project personnel and minimize accidental exposure to high-voltage electrical equipment. Areas near the project power collection cables and transmission line would not be accessible to the public, and safety precautions would be required. Changes in exposure to electric and magnetic fields would be small for the public, and impacts associated with possible long-term health effects are highly unlikely. The electrical facilities within each of the off-site alternatives would be highly unlikely to cause short-term electric or magnetic field effects because facilities produce fields of low strength and may be buried underground.

All off-site alternative sites are in an area of relatively low lightning flash density. Because of the nature of the terrain and area vegetation, the occurrence of lightning strikes may increase due to the presence of proposed project structures. The frequency of lightning strikes would likely be

a function of the height of the wind turbine generators and be proportional to the number of project structures installed (i.e., which alternative is selected). In accordance with required federal safety standards, the turbines and substation would include lightning protection systems.

A fire could occur in the turbines, or the project electrical systems as a result of equipment malfunction, lightning strike, electrical short, terrorism, sabotage, vandalism, or aircraft impact. Temperature sensors and fluid level detectors would detect internal fires and send an alarm signal to the central SCADA system, which would notify project operators of the situation.

Health and safety decommissioning impacts for all off-site alternatives would be similar to construction impacts.

### **Kittitas Valley Wind Power Project**

Shadow flicker impacts were evaluated for 17 residences in vicinity of the project. Although three residences would be exposed to lengthier shadow flicker effects, it was determined that the exposure would not result in health effects for the residents.

The project proponent would also develop and implement a fire protection and prevention plan for both construction and operation activities, in coordination with the Kittitas County Fire Marshal and other appropriate agencies.

#### **Alternative 1: Swauk Valley Ranch**

Because the Swauk Valley Ranch alternative is an overall smaller proposal, with fewer turbines, and less miles of access roads, it may present a lower fire and explosion risk during both construction and operation.

Detailed analyses of potential shadow flicker impacts were not performed for the hypothetical layout for the Swauk Valley Ranch alternative. It is expected that, based on the hypothetical layout, some residences concentrated along the Yakima River and to the south of the proposed site could be exposed to shadow-flicker (based on a 2,000-foot distance threshold).

#### **Alternative 2: Springwood Ranch**

Because the Springwood Ranch alternative is an overall smaller proposal, with fewer turbines, and less miles of access roads, it may present a lower fire and explosion risk during both construction and operation.

Detailed analyses of potential shadow flicker impacts were not performed for the hypothetical layout for the Springwood Ranch alternative. It is expected that, based on the hypothetical layout, some residences on the eastern edge of Sunlight Waters would be exposed to shadow-flicker (based on a 2,000-foot distance threshold).

### **Alternative 3: Wild Horse Wind Power Project**

The proposed project should not produce shadow-flicker effects on any existing residences in the area because the residences are too far from the turbines and are additionally shielded by existing terrain that separates them from the turbines.

The project proponent would also develop and implement a fire protection and prevention plan for both construction and operation activities, in coordination with the Kittitas County Fire Marshal and other appropriate agencies.

### **Alternative 4: Desert Claim Wind Power Project**

Shadow-flicker caused by wind turbines is not expected to result in health effects in residential areas. 38 of 45 receptors would, however, experience varying degrees of exposure to shadow flicker. Micro siting some turbines was determined as a possible mitigation measure to reduce exposure of some receptors.

The proponent would implement recommendations received from the Kittitas County Fire Marshal to mitigate fire hazards in the project area.

## **3.5 ENERGY AND NATURAL RESOURCES**

### **3.5.1 Affected Environment**

#### **Kittitas Valley Wind Power Project**

Electrical services in the project vicinity are provided by Puget Sound Energy (PSE), Kittitas County Public Utility District (PUD) No. 1, and the City of Ellensburg. Sources of this power are primarily Columbia River hydroelectric facilities operated by the Grant County PUD and the Bonneville Power Administration (Bonneville). Five sets of Bonneville and one set of PSE electrical transmission lines run east-west across the project site.

Petroleum products, including vehicle and equipment gasoline and diesel fuels, and machinery lubricants are available for purchase from numerous commercial outlets in the project vicinity. Other nonrenewable resources in the project vicinity are primarily gravel extracted from local sources and used locally. The primary renewable resource in the project area is wind.

#### **Alternative 1: Swauk Valley Ranch**

Electrical services in the project vicinity are provided by Puget Sound Energy (PSE), Kittitas County Public Utility District (PUD) No. 1, and the City of Ellensburg. Sources of this power are primarily Columbia River hydroelectric facilities operated by the Grant County PUD and Bonneville. Five sets of Bonneville and one set of PSE electrical transmission lines run east-west across the project site.

Petroleum products, including vehicle and equipment gasoline and diesel fuels, and machinery lubricants are available for purchase from numerous commercial outlets in the project vicinity. Other nonrenewable resources in the project vicinity are primarily gravel extracted from local sources and used locally. The primary renewable resource in the project area is wind.

#### **Alternative 2: Springwood Ranch**

As noted above, several systems for transmission of electrical power are available in Kittitas County. However, the closest location for interconnection for the Springwood ranch is the BP transmission line, located 5 miles away. Interconnection of a project at Springwood Ranch would therefore require construction of a 5 mile feeder line.

Petroleum products, including vehicle and equipment gasoline and diesel fuels, and machinery lubricants are available for purchase from numerous commercial outlets in the project vicinity. Other nonrenewable resources in the project vicinity are primarily gravel extracted from local sources and used locally. The primary renewable resource in the project area is wind.

#### **Alternative 3: Wild Horse Wind Power Project**

Electrical services in the project vicinity are provided by PSE, and Bonneville. The Project proposes to interconnect to either of these systems; however, 5 to 8 miles of feeder line would need to be constructed to allow the interconnection.

Petroleum products, including vehicle and equipment gasoline and diesel fuels, and machinery lubricants are available for purchase from numerous commercial outlets in the project vicinity. Other nonrenewable resources in the project vicinity are primarily gravel extracted from local sources and used locally. The primary renewable resource in the project area is wind.

#### **Alternative 4: Desert Claim Wind Power Project**

Existing energy sources in Kittitas County include natural gas and electricity. PSE and Kittitas County Public Utility District (PUD) No. 1 supply electricity within the county. Little electricity production takes place in Kittitas County. Large amounts of electrical energy are transported throughout the county by a number of existing high-voltage transmission lines. Five sets of Bonneville and one set of PSE electrical transmission lines run east-west across the project site.

Private wells supplies residential and agricultural water users in the project vicinity. Petroleum products, including vehicle and equipment gasoline and diesel fuels, and machinery lubricants are available for purchase from numerous commercial outlets in the project vicinity. Other nonrenewable resources in the project vicinity are primarily gravel extracted from local sources and used locally. The primary renewable resource in the project area is wind.

### **3.5.2 Impacts of Proposed Action and Alternatives**

#### **Kittitas Valley Wind Power Project**

Project construction would use materials that require energy for their production. Energy (gasoline, diesel fuel, and electricity) would also be required to transport these materials to the project site and to operate construction equipment, with an estimated 25,000 gallons of diesel and gasoline consumed. Portable generators would produce the electricity required for construction activities. Other nonrenewable resources used in construction would include water, steel, concrete, and gravel (aggregate). An estimated 11,000 to 13,000 tons of steel would be required to construct the turbines and towers. 25,000 to 35,000 cubic yards of concrete would be consumed to build roads, crane pads, and turbine foundations. 145,535 to 186,325 cubic yards of gravel (aggregate) would be required to construct roads, turbine and crane pads, and other project facilities.

Operation and maintenance of the project would consume nonrenewable natural resources including fuel, electricity, water, lubricating oils, greases, and hydraulic fluids. The KKWPP would use an estimated 8,500 gallons of petroleum products per year. The project would use the kinetic energy in wind and transform it by the wind turbine generators into electricity. With a nameplate capacity of 181 to 246 MW, the project would increase the availability of renewable energy in the Pacific Northwest. Electricity for project operations would mostly be generated by the project itself. During periods when the wind turbines are not generating electricity, power would be purchased from the regional utility.

### **Alternative 1: Swauk Valley Ranch**

Project construction would use materials that require energy for their production. Energy (gasoline, diesel fuel, and electricity) would also be required to transport these materials to the project site and to operate construction equipment. Portable generators would produce the electricity required for construction activities. Other nonrenewable resources used in construction would include water, steel, concrete, and gravel (aggregate).

Operation and maintenance of the project would consume nonrenewable natural resources including fuel, electricity, water, lubricating oils, greases, and hydraulic fluids. The project would use the kinetic energy in wind and transform it by the wind turbine generators into electricity. The project would have a nameplate capacity in the vicinity of 63 MW and would increase the availability of renewable energy in the Pacific Northwest. Electricity for project operations would mostly be generated by the project itself. During periods when the wind turbines are not generating electricity, power would be purchased from the regional utility. The project would have little or no impact on the supply and price of electricity available to local consumers.

### **Alternative 2: Springwood Ranch**

Energy consumption during project construction would not have significant impacts because it would not require large volumes of fuel or electricity and not affect locally available energy sources. The use of sand, gravel, steel, water and concrete during construction would not significantly affect the local supplies.

Operation of the wind farm would have a minimal demand for energy and natural resources. The project would have a nameplate capacity of 65 MW, increasing the supply of renewable energy to the region. The project would have little or no impact on the supply and price of electricity available to local consumers.

### **Alternative 3: Wild Horse Wind Power Project**

Energy consumption during project construction or decommissioning would not require large volumes of fuel or electricity and would not significantly affect locally available energy resources.

Use of sand, gravel, steel, water and concrete would not have a significant effect on their supply in the area, since most of these materials would primarily be extracted on-site.

Project operation would have minimal demand for energy and natural resources. The project nameplate capacity would be between 158 and 312 MW, increasing the supply of renewable energy to the region.

The project would have little or no impact on the supply and price of electricity available to local consumers.

#### **Alternative 4: Desert Claim Wind Power Project**

Energy consumption during project construction would not have significant impacts because it would not require large volumes of fuel or electricity and not affect locally available energy sources. Electricity needed for construction and operation of the project would likely be supplied by Kittitas County PUD (Kittitas County 1999), although small-scale portable diesel generators might be operated to supply electricity used in the construction process. The use of sand, gravel, steel, water and concrete during construction would not significantly affect the local supplies.

The Desert Claim Project would have a nameplate capacity of 180 MW, increasing the supply of renewable energy to the region. The project would have little or no impact on the supply and price of electricity available to local consumers.

## **3.6 LAND USE AND RECREATION**

### **3.6.1 Affected Environment**

#### **Kittitas Valley Wind Power Project**

The roughly 7,000-acre project area is characterized by a rural landscape of rolling hills and rangeland with scattered residences. Approximately 5,000 acres of the project area is in private ownership, with the remaining 2,000 acres owned by the state of Washington and managed by the Washington Department of Natural Resources. Land use in the project area consists of cattle grazing interspersed with some rural residential development. The overall population density in the project area is low, with approximately 60 dwellings within 1 mile of the proposed project. The closest residence is approximately 800 feet from the nearest proposed wind turbine. Other land uses in the project area include a commercial gravel quarry, an inactive gravel quarry, electric transmission lines and communication towers, two state highways (US 97 and SR 10), two county roads (Bettas Road and Hayward Road), 2,075 acres owned by DNR currently leased for grazing, a 550-acre parcel of private land in the Swauk Creek drainage currently under a conservation easement with the Nature Conservancy of Washington, and agricultural lands along the Yakima River.

The project area contains two Kittitas County zoning designations—Agriculture-20 and Forest and Range. The Agriculture-20 zone is dominated by farming, ranching, and rural lifestyles. Permitted uses include residential, agriculture, and forestry practices, with minimum lot sizes of 20 acres. The Forest and Range zone is intended to provide areas where natural resource management is the highest priority. Permitted resource management uses include logging, mining, quarrying, agricultural practices, and residential uses including single-family residences, duplexes, and cluster subdivisions. The minimum lot size is 20 acres.

The Kittitas Valley area offers opportunities for a variety of recreational activities, including forests and wilderness areas, wildlife areas and refuges, boat launches, beaches and other water use sites, parks, campsites, and museums. The 2.2 million acre Wenatchee National Forest is a major recreational destination for winter sports, hiking, camping, picnicking, and other recreational activities. The John Wayne Trail extends along the south side of the Yakima River. Some hunting occurs in the project area on both private and public lands.

#### **Alternative 1: Swauk Valley Ranch**

The roughly 6,000-acre Swauk Valley Ranch site is located north of the Yakima River approximately 12 miles northwest of the City of Ellensburg in the vicinity of Lookout Mountain. The site is located west of the Kittitas Valley site and has many similar features. As with the Kittitas Valley site, Swauk Valley Ranch site is characterized by a rural landscape of rolling hills forest and rangeland with scattered residences. Steep slopes define the site's northern, western and southern boundaries. The entire site is in private ownership (multiple property owners) and is zoned Forest and Range. Natural resource management is the highest priority in the Forest and Range zone. Permitted resource management uses include logging, mining, quarrying, agricultural practices, and residential uses including single-family residences, duplexes, and cluster subdivisions. The minimum lot size is 20 acres. Land use on the site consists of cattle



grazing interspersed with a few rural residences. Other land uses in the project area include a gravel quarry, electric transmission lines and communication towers. The site is crossed by a number of unpaved access roads. A 550-acre parcel of private land in the forested panhandle portion of the site is currently under a conservation easement with the Nature Conservancy of Washington. The John Wayne Trail extends along the south side of the Yakima River. Some hunting occurs in the project area on both private and public lands.

### **Alternative 2: Springwood Ranch**

The Iron Horse State Park/John Wayne Trail crosses the project site along the Yakima River in the northern area and bisects the southern area. Approximately 320 acres of the Springwood Ranch site are included within the authorized boundary of the L.T. Murray Wildlife Recreation Area (U.S. Forest Service, 1990), but are privately owned lands. Lands immediately adjacent to the site are privately owned, (with the exception of the I-90 right-of-way). There are no existing residential land uses. In the Kittitas County Comprehensive Plan, the Springwood Ranch and surrounding areas are designated Commercial Agriculture and Rural, and are zoned Forest and Range-20 and Agriculture-20.

### **Alternative 3: Wild Horse Wind Power Project**

The approximately 5000 Acre Wild Horse site is located in the east-central portion of Kittitas County, approximately 14 miles east of Ellensburg and 4 miles north of I-90. The site includes uplands at the eastern margin of the Kittitas Valley and slopes that drain eastward to the Columbia River north of Vantage. Whiskey Dick Mountain, with a maximum elevation of 3,842 feet, is the dominant terrain feature of the project site.

The lands within the Wild Horse site are predominantly in private ownership, and all of the private lands are held by one owner. Three sections (approximately 1,920 acres) of State lands administered by WDNR are included within the site. The area adjacent to the site has a similar ownership pattern. The Wild Horse site is within an area designated as Rural under the Kittitas County Comprehensive Plan.

All of the area within the site itself is zoned as Forest and Range (FR). A portion of the prospective transmission line route for interconnection with a nearby Bonneville transmission line crosses lands zoned as Ag-20. The site is currently used as rangeland, under grazing leases executed by the present owner. The only existing structures on the site consist of several meteorological towers and a communications facility on Cribb Peak, a point on the eastern end of the ridge formed by Whiskey Dick Mountain.

Lands adjacent to the Wild Horse site to the south and west have a similar character and are also used as rangeland. Cultivated agricultural areas are located farther (generally 3 to 5 miles) to the west. To the north and east, the site is bordered primarily by resource lands managed as wildlife habitat by the Washington Department of Fish and Wildlife (WDFW). These include the Schaake Wildlife Area to the east and southeast, and the Quilomene Wildlife Area to the north and northeast.

There are no existing residences located within the boundaries of the Wild Horse site or on the adjoining lands. A small number of seasonal cabins scattered along the upper reaches of Parke Creek, to the north/northwest of the site, are the closest residences to the site. Farm or ranch residences and small pockets of rural residential development are located at the eastern edge of the Kittitas Valley, about 3 miles or more from the Wild Horse site.

There are no recreational facilities at the Wild Horse Site and no general public access to the site. Most of the site is privately owned, although WDNR administers approximately 1,920 acres of the site. Because there are no public roads accessing the site, recreational use can only occur with the permission of the private landowner that controls the site. At least in the recent past, hunting has traditionally been allowed to occur on the private lands within the Wild Horse site.

The Schaake and Quilomene Wildlife areas, administered by the WDFW, are adjacent to the Wild Horse site and are managed to accommodate both hunting and non-consumptive wildlife use. They are part of a complex of lands that are managed to provide habitat for the Colockum elk herd and other wildlife, and support big-game hunting during the fall season. Annual hunting use of the WDFW lands is estimated at approximately 1,000 hunters.

The nearest developed recreation facilities to the Wild Horse site are at Gingko Petrified Forest State Park, administered by the Washington State Parks and Recreation Commission. Kittitas County also maintains a public boat launch facility at Vantage.

#### **Alternative 4: Desert Claim Wind Power Project**

Agricultural and rural residential uses predominate in the immediate area of the proposed site and to the south toward the Ellensburg Urban Growth Area (UGA); forested areas are located to the north. The majority of land onsite and within 1 mile of the project area is privately owned and used for grazing, feed crop production, forestry, electrical transmission, outdoor recreation, and rural residences (approximately 83 within one-half mile). The North Branch Canal, which provides irrigation water to this area of the Kittitas Valley, follows the southern edge of the site.

The proposed wind power project would be developed on 5,237 acres in Kittitas County, Washington. With the exception of one parcel in the northern part of the project area, on which the Washington Department of Natural Resources owns mineral rights, all of the land is entirely owned by eight private local landowners.

There is no public access to any of the proposed project lands, and there are no recreational facilities within the project area. Outdoor recreation can occur within the project boundary only with specific permission from an individual landowner. Incidental use within the project area would be able to resume at current levels during operation and maintenance. Hunting would not be permitted.

### **3.6.2 Impacts of Proposed Action and Alternatives**

#### **Kittitas Valley Wind Power Project**

Potential direct impacts of the proposed KVVPP would include conversion of rural lands to utility-related uses, potential conflicts between the project and onsite and off-site recreation activities, and increased demand for park and recreational resources. Project construction would temporarily alter 231 to 371 acres of land, temporarily interfering with existing rangeland uses and grazing operations. Cattle or other livestock would need to be removed from the most intensive construction areas. Construction activities could affect the use and enjoyment of recreational activities such as hunting and hiking in the project area, if allowed today.

During operation, existing rangeland and grazing uses could resume throughout most of the project area.

#### **Alternative 1: Swauk Valley Ranch**

Potential direct impacts include conversion of rural lands to utility-related uses. Project construction would permanently alter 165 acres on the site to accommodate project facilities including turbine tower foundations, access roads, underground and overhead transmission lines, substations, operating and maintenance center and other supporting facilities. This permanent conversion of rangeland uses to wind energy production would result in an unavoidable impact. Construction activities could temporarily interfere with existing rangeland uses and grazing operations. Cattle or other livestock would need to be removed from the most intensive construction areas. Construction activities could affect the use and enjoyment of recreational activities such as hunting and hiking in the project area. Some wind turbines may be visible from I-90 and portions of the John Wayne Trail.

#### **Alternative 2: Springwood Ranch**

Approximately 30 acres of grasslands would be converted to wind energy facility use, with existing grazing activity being temporarily displaced or disturbed. Wind turbines would be greater in scale than nearby rural residential uses, but are not more intensive than other resource activities in terms of noise and land use impacts. The overall direct effect of the project on land use patterns is not likely to be significant because wind production is generally seen as compatible with rural resource uses. In addition, the project would not attract supporting land uses, generate more development, significantly increase traffic, or increase demand for commercial, industrial, or housing services nearby.

#### **Alternative 3: Wild Horse Wind Power Project**

Construction impacts would include temporary disturbance of grazing land from 290 acres to 401 acres, and reduction in available land for livestock grazing. Temporary removal of livestock during the construction of the project would be required.

The permanent footprint of the project will remove approximately 165 acres from open space and grazing uses for the life of the Wild Horse site (at least 20 years). At a maximum, the removal of approximately 8,600 acres of land from the approximately 445,000 acres of pasture or unimproved grazing land in Kittitas County would represent a reduction of 1.9%.

Construction activities would not directly affect any existing recreation facilities, as there are no such facilities in or adjacent to the project area. Recreational visitors using the nearby WDFW wildlife areas or the Ginkgo State Park facilities might notice construction activities on the site or project-related construction traffic and might be subject to occasional traffic delays or detours. Existing recreational use of the project area is limited to hunting with the specific permission of the current landowner, and would presumably be displaced to the extent that the construction period coincided with hunting seasons. Some hunting activity could be allowed during the operating period. If hunting were displaced, it would constitute a minor loss of recreational opportunity.

#### **Alternative 4: Desert Claim Wind Power Project**

During construction of the wind turbines and associated facilities, land uses within the project area would continue, although some land would be temporarily disturbed. During operations, 82.4 acres, or 1.6%, of the project area would be used for wind farm facilities and infrastructure (i.e., the permanent project footprint).

Overall, direct impacts to recreational resources and opportunities would be very low or negligible. Current recreation activity within the project area, which consists of (at most) limited informal use, most recreational activities that are currently possible would be able to resume at current levels during operation and maintenance. During operation, hunting would not be permitted to avoid possible damage to turbines or other project facilities.

## **3.7 SOCIOECONOMICS**

### **3.7.1 Affected Environment**

The population of the County was 33,362 in 2000. Between 1990 and 2000, the County population increased at an annual rate of 2.2%. It is projected that the County population will continue to grow approximately 1.1% annually through 2020. Between 1990 and 2000, housing in the County increased at an average annual growth rate of 2.2%, with the number of housing units increasing from 13,215 in 1990 to an estimated 16,475 in 2000.

In 2000, an estimated 11,822 people were employed in the County. The highest percentages of employment in the study area were in the government (local, state, and federal), trade (wholesale and retail), and service sectors. Per capita income of County residents in 2000 was \$21,196, about 68% of the state average of \$31,230. From 1997 to 2000, the County's per capita income grew at an annual rate of 3.1%, compared to the statewide rate of 4.2%.

The total assessed value of property in the County in 2001 was approximately \$2.2 billion. In 2001, the County general fund had revenues of about \$11 million, of which approximately 48% comes from taxes. Property taxes account for about 28% of total revenues. Sales and use taxes provide approximately 18% of total revenues.

According to the 2000 U.S. Census, the County had 16,475 housing units in 2000. Of those, 81.2% were occupied and 18.8% were vacant.

In 2001, the total County labor force was estimated at 17,420 (USBEA 2002). According to the 2000 U.S. Census, the County had an unemployment rate of 5.7%. Median household income was \$32,546 and the per capita income was \$18,928.

Eight percent of all employees in the county are in farm-related positions, and the remaining 92% are in non-farm positions. Of all non-farming employees, 74% are in private sector occupations and 26% are in government and government enterprises.

#### **Kittitas Valley Wind Power Project**

The affected environment described above is also representative of the affected environment for the Proposed Action.

#### **Alternative 1: Swauk Valley Ranch**

The affected environment described above is also representative of the affected environment for the Swauk Valley Ranch alternative.

#### **Alternative 2: Springwood Ranch**

The affected environment described above is also representative of the affected environment for the Springwood Ranch alternative.

### **Alternative 3: Wild Horse Wind Power Project**

The affected environment described above is also representative of the affected environment for the Wild Horse alternative.

### **Alternative 4: Desert Claim Wind Power Project**

The affected environment described above is also representative of the affected environment for the Desert Claim alternative.

## **3.7.2 Impacts of Proposed Action and Alternatives**

### **Kittitas Valley Wind Power Project**

Construction of the KVVPP would result in short-term benefits to overall County and regional employment in the County. The direct construction employment impact of the project would be approximately 253 new temporary jobs, with a short-term peak estimated at 160 construction workers. An estimated 30% to 50% of the construction workforce would originate from the Ellensburg (approximately 12 miles away) and Yakima (within a 1-hour drive) areas. Construction personnel would also likely be hired from the Seattle/Tacoma area, about 1.5 to 2 hours away, and would probably stay in local recreational vehicle parks and motels. Minimal temporary population impacts from the project would result from worker relocation and in-migration needed to meet project labor demands.

Total income (direct, indirect, and induced) generated during the construction phase of the project is estimated to be more than \$5.7 million (in 2002 dollars) in the County, a temporary but beneficial effect to the County economy. The project would generate an increase of \$1,249,600 in annual property tax revenue to the County, in addition to other fiscal benefits, such as increased sales and use taxes, license and permit fees, and charges for services.

Operation of the proposed project is expected to require up to 20 full-time employees. One half of the permanent employees are expected to be resident workers from the County, resulting in long-term benefits to overall County employment.

Construction and operation of the KVVPP is not expected to negatively affect long term property values in the vicinity of the project.

Decommissioning impacts would be similar to those described above for the Proposed Action.

### **Alternative 1: Swauk Valley Ranch**

The temporary population impacts from worker relocation and in-migration needed to meet project labor demands of the Swauk Valley Ranch Alternative would be similar to the Springwood Ranch Alternative and relatively minor. Construction jobs created by the project would result in short-term benefits to overall County and regional employment. Operation of the proposed project is expected to require between 12 and 20 full-time employees, resulting in long-

term benefits to overall County employment. Economic benefits to the County would also be similar to those of the Springwood Ranch alternative.

Decommissioning impacts would be similar to, but less than, those described for the Proposed Action above because this alternative would be a smaller project overall.

### **Alternative 2: Springwood Ranch**

Impacts from construction of the Springwood Ranch Alternative on population, housing, and economics would be similar to, but less than, the Proposed Action described above. The project would employ an estimated 150 workers during the construction phase. Non-local workers would most likely seek temporary housing during construction, and impacts are not expected to be significant. Spending on labor and materials would indirectly result in additional jobs, and total labor income would increase during the construction phase.

Operation of the proposed project is expected to require 10 full-time employees. Economic impacts during operations would include an estimated \$315,000 in labor income and \$700,000 in other value added per year.

Decommissioning impacts would be similar to, but less than, those described for the Proposed Action above because this alternative would be a smaller project overall.

### **Alternative 3: Wild Horse Wind Power Project**

The project would employ an estimated 250 workers during construction and 14 to 18 during operations. There would not be a noticeable impact on the population in Ellensburg or Kittitas County.

No houses would be moved or destroyed; therefore, there would be no direct impacts on housing. Temporary housing would be needed for non-local workers during construction of the project. Based on supply and vacancy rates, impacts are not expected to be significant.

Spending on labor and materials would result in an additional 71 full and part-time jobs during construction. Total labor income during construction would be approximately \$4.8 million.

Economic impacts during operations would include about \$1.4 million in labor income. It is expected that the project would result in both increased revenues for state schools and local public services in the area, as well as reduced property tax levy rates for local taxpayers.

### **Alternative 4: Desert Claim Wind Power Project**

In general, most of the potential population, housing, and economic impacts for the Desert Claim Alternative would be similar to, but less than, those described for the Proposed Action above. Because the workforce required for construction (150 workers) and operation (10 workers) of the project would be relatively small (in the context of total county-wide economic activity), the project is not expected to significantly impact population, housing, or employment throughout the County. Any impacts would be localized and temporary. Total labor income during

construction is estimated to be over \$3.8 million. Together, potential corporate profits, property rents, and net interest are estimated at over \$1.5 million. This alternative is expected to indirectly generate minor amounts of sales tax revenue.

Impacts on economics within the County during operation of the Desert Claim Alternative are estimated at \$0.9 in labor income and \$2 million in other value added annually. Potential property tax revenues from the Desert Claim Alternative are estimated at a maximum of nearly \$1.1 million for the first year of operation.

Decommissioning impacts would be similar to, but less than, those described above for the Proposed Action.



## **3.8 CULTURAL RESOURCES**

### **3.8.1 Affected Environment**

#### **Kittitas Valley Wind Power Project**

The project area is located in the Columbia Plateau physiographic region or the Southern Plateau culture region. During late historic times, the Kittitas Indians occupied the upper Yakima River drainage. Neighboring groups included the Wanapum to the east, the Yakama immediately to the south, and the Mishnapam, Taitnapam, and Klickitat farther south. The proposed project is situated in an area ceded by the Kittitas, which is now a part of the Yakama Nation. The Applicant and the Washington Energy Facility Site Evaluation Council have been actively consulting with the Yakama Nation on this project.

Archaeologists and ethnographers have recorded at least nine villages and a network of trails in the Kittitas Valley. Two villages were near the project area. The largest, *Klakla*, had a population of 500 people and was located about 1 mile north of Thorp, opposite the mouth of Taneum Creek, which is about 5 miles south of the project site. *Ti'plas* had a population of 50 and was located at the mouth of Swauk Creek, approximately 2 miles southwest of the project site. Archaeological survey work for the project recorded two prehistoric stone tool and flake sites.

#### **Alternative 1: Swauk Valley Ranch**

No recorded archaeological sites are located within the boundaries of the Swauk Valley Ranch site; however, eleven recorded sites are known to exist within a 1-mile radius of the site.

#### **Alternative 2: Springwood Ranch**

Six cultural resources (two prehistoric and four historic) and one potential trail have been identified within Springwood Ranch (Boas Inc. 1989; DePuydt 1990; Para 1990, Nelson et al. 1996). Both of the prehistoric cultural resources may be associated with burial activities in the area. The reported prehistoric/historic trail is supposed to have crossed through the center of the property. Identified historic resources include two sites associated with railroad activities, one historic burial area, and one area associated with early irrigation activities. Fourteen prehistoric cultural resources, 16 historic cultural resources and the documentation of two ethnographic villages were discovered when portions of the surrounding areas were surveyed (Boas Inc. 1989; DePuydt 1990; Nelson et al. 1996; Goetz 1996; Miller 1996).

#### **Alternative 3: Wild Horse Wind Power Project**

An archival search for the Wild Horse site indicated six previously recorded archaeological and historical sites were located within approximately one-half mile of the project area (personal communication, P. Trautman, Lithic Analysts, Olympia, Washington, October 22, 2003). Some of the records document trails that led from the Columbia River to the Kittitas Valley, and others address archaeological sites at some of the springs near Whiskey Dick Mountain. The sites at Pine Spring and Government Spring are currently listed as one site on the National Register. The

on-site inventory of the Wild Horse project area identified three previously unrecorded archaeological sites, including a lithic scatter and two rock features. The field survey also recorded an abandoned section of the Old Vantage Highway (an historical feature) crossed by the route of the possible transmission interconnection to an existing PSE transmission line.

#### **Alternative 4: Desert Claim Wind Power Project**

The Desert Claim Draft EIS identified that Prehistoric archaeological materials have been found in Caribou and Little Caribou Creeks draining the foothills north of Kittitas Valley, in the Trail Creek system, and at Grissom's Ranch within the valley proper. The limited amount of excavation in the upper Yakima River valley currently precludes a complete understanding of prehistoric land use systems in the valley, but a Clovis point found near Lake Cle Elum and later-period Cascade-like points (Vantage phase) found in the Keechelus-Cle Elum area indicates use of the upper basin beginning soon after deglaciation and persisting to at least the mid- Holocene (summarized in DePuydt 1990). Cultural resources investigations passing through the valley have also identified archaeological and historical sites related to settlement, mining in the Cle Elum vicinity, stock raising, logging, railroads, and the development of irrigation.

The Desert Claim Draft EIS also documented that individuals were known to still exercise their reserved treaty hunting rights within the vicinity of the project area and groups still gathered to harvest roots on the fan where Naneum Creek emerges from the Wenatchee Mountains northeast of the Project. The lands within the project area are privately owned, however, and reserved treaty rights for off-reservation activities apply to open and unclaimed lands. Archival research revealed that no Traditional Cultural Properties (TCPs) had been documented within the project boundaries.

Thirteen prehistoric sites, 19 historic sites, and 28 historic isolates were identified in the Desert Claim 5,237 acre project area. 13 of the prehistoric sites are newly recorded, as are 18 of the historic sites. A previously recorded historic site, the Springfield Farm, was revisited. Two lithic scatters produced by rockhound testing for agate-bearing nodules were also identified, but are not considered historic because they are less than 50 years old.

### **3.8.2 Impacts of Proposed Action and Alternatives**

#### **Kittitas Valley Wind Power Project**

Ground-disturbing activity during construction could potentially affect the two prehistoric archaeological sites within the project area. These archaeological sites should be avoided during construction to prevent any damage to either of them. Mitigation measures would ensure that potential impact on cultural resources in the project area during construction activities would be minimized, and that appropriate state and Tribal agencies would be contacted if any sites were uncovered during construction, and the sites and artifacts adequately protected.. No direct impacts to any known cultural resources would occur during normal operation and maintenance of the project.

Tribal consultation is ongoing to determine whether significant resources, such as areas important in Yakama or Colville history or cultural and religious practices, would be indirectly

affected by the project. Tribal Nations would be contacted prior to all ground-disturbing activities and invited to have representatives present during these activities.

Decommissioning the project at the end of its useful life also poses the potential for further impacts if decommissioning activities stray beyond the perimeters of the pre-existing disturbance zones used during construction.

#### **Alternative 1: Swauk Valley Ranch**

Ground-disturbing activity during construction could potentially uncover prehistoric archaeological sites. Mitigation measures would ensure that potential impact on cultural resources in the project area during construction activities would be minimized. No direct impacts to any known cultural resources would occur during normal operation and maintenance of the project. In this hypothetical scenario, any affected Tribal Nation would be notified prior to ground disturbing activities, and would be invited to have representatives present during such activities.

Decommissioning the project at the end of its useful life also poses the potential for further impacts if decommissioning activities stray beyond the perimeters of the pre-existing disturbance zones used during construction.

#### **Alternative 2: Springwood Ranch**

Construction activities could destroy artifacts or structures or disturb relationships among artifacts and their context; however, it is not known how many of the seven identified resources would be subject to direct impacts from project construction. Because one of the cultural resources is a prehistoric trail that reportedly crossed through the middle of the property, it is possible the trail route would intersect multiple elements of a wind energy project on this site. The two prehistoric resources and the historic resources associated with railroad and irrigation activities are likely to be located near the Yakima River and would not likely be subject to direct impacts. Indirect impacts to cultural resources would primarily involve changes to the visual context of the resources and to a number of the 30 cultural resources that have been identified in the area surrounding the Springwood Ranch. In this hypothetical scenario, any affected Tribal Nation would be notified prior to ground disturbing activities, and would be invited to have representatives present during such activities.

Decommissioning the project at the end of its useful life also poses the potential for further impacts if decommissioning activities stray beyond the perimeters of the pre-existing disturbance zones used during construction.

#### **Alternative 3: Wild Horse Wind Power Project**

Direct construction impacts on cultural resources would likely be minimal or nonexistent. No project facilities coincide with the locations of inventoried cultural sites.

Mitigation measures would ensure that potential impact on cultural resources in the project area during construction activities would be minimized, and that appropriate state and Tribal agencies

would be contacted if any sites were uncovered during construction, and the sites and artifacts adequately protected.

No direct impacts on any known cultural resources would occur during normal operation and maintenance of the project. There would be no increase in the potential for disturbance and/or removal of artifacts from cultural resource sites

Decommissioning the project at the end of its useful life also poses the potential for further impacts if decommissioning activities stray beyond the perimeters of the pre-existing disturbance zones used during construction.

#### **Alternative 4: Desert Claim Wind Power Project**

Potential direct impacts to documented cultural resources have been identified based on the proposed layout of project facilities relative to the locations of the known resources. Any cultural resources within or very close to the area of temporary construction disturbance around the various project facilities would presumably be subject to direct impacts. A map analysis (which is not documented in the EIS because the locations of the cultural sites are confidential and not appropriate for disclosure) indicates that six identified cultural resource sites would experience unavoidable adverse impacts associated with turbine, access road and collection system construction if the project facilities were sited according to the current design. Of these six sites, four are historic sites with either standing structures or structural remains. The fifth site, Springfield Farm, is a dual-component site that includes standing historical structures as well as a prehistoric component with archaeological materials indicating that the site functioned as a residential base. The sixth site is a large prehistoric lithic procurement site located at the northwest periphery of the project. Destruction of or damage to these resources would represent a significant adverse impact.

Measures such as clearly marking areas that need to be avoided to protect sensitive resources and ensuring that project personnel observe those markings and their associated restrictions could minimize the potential for indirect impacts such as increased opportunities for removal of artifacts.

The proposed project is not expected to cause access-related indirect impacts to cultural resources because the degree of public accessibility to cultural resources within the project area would be less with the project than it is at present.

The prospects for avoiding cultural sites would be addressed in the final micro-siting of wind turbines and other project facilities, which would occur during final design and prior to construction.

No additional mitigation would be necessary if all identified cultural resource sites were avoided in the final layout and construction of project facilities. If final placement of the project elements resulted in unavoidable adverse impacts to a significant resource, then mitigation would be required to retrieve the scientific and historical information that makes the site significant. Appropriate mitigation measures should be tailored to the specific circumstances of the resource and developed in consultation with the Washington State Historic Preservation Officer (SHPO).

If the affected resource is prehistoric, then the SHPO would require consultation with all affected Native American tribes of the Mid-Columbia River Basin.

Decommissioning the project at the end of its useful life also poses the potential for further impacts if decommissioning activities strayed beyond the perimeters of the pre-existing disturbance zones used during construction.

## **3.9 VISUAL RESOURCES**

### **3.9.1 Affected Environment**

#### **Kittitas Valley Wind Power Project**

The project area has an open, windswept appearance. Project facilities would be located on dry, rocky grasslands used for grazing. U.S. Highway (US) 97 and the Bonneville and PSE electrical transmission lines that cross the project area in an east-west direction are the most visually prominent built features in the project area. There are several clusters of rural residences on large parcels throughout the project area.

Eleven viewpoints throughout the project area were analyzed and rated for scenic quality and visual sensitivity. These viewpoints were located along the US 97 corridor, along the ridges east of US 97, along Bettas Road, along the State Route (SR) 10 corridor, along the John Wayne Trail, at Thorp Highway, along I-90, along Lower Green Canyon Road, and along Forest Service Road 35. Scenic views of the Stuart Range, a highly noticeable and memorable feature in the project area landscape, were also considered.

Existing sources of light and glare on the Kittitas Valley site are primarily vehicle headlights on nearby roadways and light associated with residences, including glare from window glass.

#### **Alternative 1: Swauk Valley Ranch**

The Swauk Valley Ranch site has an open, expansive appearance similar to the Kittitas Valley site. Steep rocky slopes define the northern, western, and southern boundaries of the site. The northern panhandle portion of the site is heavily forested. The existing electrical transmission lines that cross the site in an east-west direction are the most visually prominent built features on the site. Several rural residences are scattered across the site.

The Swauk Valley Ranch is further from I-90 than the Springwood Ranch site but closer than Kittitas Valley and is adjacent to SR 10. Visual impacts were not evaluated for individual viewpoints surrounding the Swauk Valley Ranch site. It is expected that views of this alternative would be similar to those described for the Springwood Ranch site, although it may be slightly less visible from I-90.

Existing sources of light and glare in the Swauk Valley alternative site are primarily vehicle headlights on nearby roadways and light associated with residences, including glare from window glass.

#### **Alternative 2: Springwood Ranch**

The Springwood Ranch alternative site is located on the Thorp Prairie, a relatively broad and flat landscape within the Kittitas Valley and is adjacent to the Yakima River. Although information regarding specific viewpoints is not available for this alternative, the Springwood Ranch alternative site is located directly adjacent to I-90 in the southeastern section of the site, and the southwestern property line is generally within 0.5 mile of the Interstate for its entire length.

Views of the property from I-90 are generally unobstructed. SR 10 parallels the property for about 5–6 miles, and Springwood Ranch can be viewed from the Thorp highway. Several home sites are also present on or near the ranch and the Springwood Ranch site can be viewed from the community of Thorp.

Outdoor lighting and vehicle traffic associated with the ranch result in a minor source of light and glare. The local road network surrounding the site accounts for the majority of existing light and glare in the vicinity of Springwood Ranch. Other sources of light adjacent to the project site include reflected sunlight during the daytime and illuminated vehicle lights at night from traffic on I-90, Thorp Highway, SR 10, and Taneum Road. Outdoor lighting in Thorp and the residences in the surrounding area contribute to the local nighttime visual environment.

### **Alternative 3: Wild Horse Wind Power Project**

The Wild Horse site is a roughly 3- by 4-mile area located on the slopes of Whiskey Dick Mountain, and on the upland areas to its north. Most of the site consists of dry, rocky grasslands used for grazing, and areas covered with a mixture of sagebrush, bitterbrush, and bunchgrasses. The site has an open, windswept, and undeveloped appearance. The only existing structures on the site consist of the collection of antennae at the communication facility on Gibb Peak, a 3,558-foot elevation peak at the eastern end of the ridge formed by Whiskey Dick Mountain, and several meteorological towers at locations scattered across the site. The closest public roadways are the Vantage Highway, which lies 1.5 to 3 miles south of the project area's southern boundary, and Parke Creek Road, which lies a minimum of 4.0 miles from the project area's western perimeter. The only access into the area is by way of rough jeep trails, which are private roads.

The Kittitas Comprehensive Plan does not identify any special scenic or visual resource values in the area, and does not include any policies that are specifically oriented to protection of scenic qualities on or near the Wild Horse site.

Zone of visual influence (viewshed) analyses indicate that the Wild Horse site has the potential to be visible to one degree or another over a wide area. However, foreground and middleground views of the site, particularly from viewing areas that might have some degree of sensitivity, are limited. The Wild Horse site is not visible from the developed areas of the Ginkgo Petrified Forest State Park. The closest views from a public roadway would be those from Vantage Highway, located 1.9 miles south of the site. The closest views from residential structures would be from the area approximately 1.5 miles and further to the north of the site's northern boundary, where there are a small number of seasonal cabins scattered across the area along upper Parke Creek. Most of the areas from which the Wild Horse site has the potential to be seen by large numbers of people are located 3 or more miles from the site, so the site appears in the landscape's background zone in views from these areas. These areas include the ranch lands and pockets of rural residential development located at the eastern edge of the Kittitas Valley, located 3 miles and further from the site; the area in around the community of Kittitas, located from 7 to 12 miles west of the site; and some areas east of the Columbia River, located 7 miles and further from the Wild Horse site.

#### **Alternative 4: Desert Claim Wind Power Project**

The Kittitas basin is bordered on the north and west by the Stuart Range of the Wenatchee Mountains, on the south by Manastash Ridge and the Saddle Mountains, and on the east by the Columbia River. It is steeply sloping at the edges and mostly flat in the valley, although a prominent ridge running north from Ellensburg provides some distinct topographic relief. The Yakima River flows from northwest to southeast through the eastern portion of the Kittitas basin and I-90 crosses the basin from east to west. The Desert Claim project area is located in the north central part of the Kittitas Basin on broad alluvial fan and foothill landforms. The project area is relatively flat and open, sloping gently from north to south. High-voltage power lines cross the project area from east to west.

As in the KVVPP, existing sources of light and glare in the Desert Claim alternative site are primarily vehicle headlights on nearby roadways and light associated with residences, including glare from window glass.

### **3.9.2 Impacts of Proposed Action and Alternatives**

#### **Kittitas Valley Wind Power Project**

During construction, large earthmoving equipment, trucks, cranes, and other heavy equipment would be highly visible from nearby areas. The visual changes associated with construction activities would have a moderate to high visual impact. Areas disturbed during construction would be restored on project completion. Some construction activities may occur during evening or nighttime hours, and lighting may be needed. These would be temporary and short term impacts.

The project has the potential to create high levels of visual impact at several locations. Of the 11 viewpoints analyzed and rated for scenic quality for this alternative, high or moderately high impacts are expected in the U.S. 97 corridor where turbines would be less than 0.5 mile from the highway or from residences; along Bettas Road due to proximity to residences; along SR 10 due to proximity to a Scenic and Recreational highway; and from FS Road 35 due to the high scenic quality of existing views from this area. Moderate impacts are expected to occur along US 97 where the highway and residences are greater than 0.5 mile from the project site; to drivers on Bettas Road due to a low number of users; to residences along SR10 due to distance and orientation of views from residences; and for the Thorp Highway, I-90, and along Lower Green Canyon Road due to distance. Low levels of impact are expected for ridges east of US 97, the John Wayne Trail, and the Thorpe Highway due to distance and low levels of use. Overall, visual impacts from this alternative would be greater than for the Wild Horse project and the Springwood Ranch and Swauk Valley Ranch alternatives due to proximity to a greater number of residences and views from a greater number of high use roads and scenic areas.

Turbines would be visible from US 97 and on the ridge tops throughout the project vicinity. The turbines would be seen against the sky or against the slopes of distant hills. Under some lighting conditions, the turbines would contrast with the backdrop, increasing the visual impact. Brown turbines have greater contrast with the sky than gray turbines and would have greater visual



impact on views where they are seen against the sky. Accordingly, the turbines would have a neutral gray finish to minimize aesthetic impacts.

Impacts from operations and maintenance would occur primarily in association with lighting required by the FAA. As per FAA regulations, specific turbines would be equipped with lights that flash white during daylight hours and red at night. The white lights would be visible during the day but not considered intrusive however the red flashing lights would be noticeable, particularly from nearby residences, and may adversely impacts views.

Turbines would also be illuminated at night and night lighting of turbines and other facilities would increase nighttime illumination in the vicinity, potentially impacting views from roads and residences.

The potential for impacts from glare would depend largely on materials used, however this would be minimized by using a low-reflectivity finish on all turbines.

### **Alternative 1: Swauk Valley Ranch**

Impacts to visual resources under this alternative would be similar to those described for the Springwood Ranch alternative, with both construction activity and operating turbines visible from I-90, SR10, and from nearby residences. Although information from individual viewpoints is not available for this alternative, it is expected that high level impacts would result from construction of this alternative due its location.

The project would also have to comply with applicable FAA lighting requirements, as explained above for the KVVWPP; the number of turbines requiring FAA lighting has not been evaluated at this time. Nighttime lighting of turbines and facilities would also be required. Impacts would be similar to those described for the Springwood Ranch alternative below. Impacts from light and glare would also be similar to those described for the Springwood Ranch alternative.

### **Alternative 2: Springwood Ranch**

Visual impacts associated with construction would have a temporary but moderate visual impact on views from nearby residences and roads in the Thorp Prairie area. The construction-related visual impact from more distant viewpoints would be low.

The Springwood Ranch project would have significant visual impacts during operation. This alternative would be highly visible from I-90, with turbines located in middle-ground views and breaking the skyline, with similar impacts to views from SR 10 and the Thorp Highway. The visual quality of expected future views would be affected by the size, color, and arrangement of the turbines. The additional impact of experiencing the turbine's strong vertical forms across the wide-open, horizontal space would affect rural residences. From all views, the turbine arrangement would appear cluttered and overwhelming because it would be unrelated to a topographic or geometric order and would include too many turbines in a continuous cluster (Gipe 2002). Overall, development of a wind farm on Springwood Ranch would significantly change the aesthetic character of the local landscape, especially as viewed from I-90, and high level impacts would be expected.

The required aviation marking lights would result in significant additional impacts on nearby residents and passing motorists. Flashing white lights during the day would be noticeable, but not significant due to the lack of contrast with daylight. Flashing red lights at night would be visible from I-90, the Thorp Highway, and SR 10, as well as from residences in Thorp and the immediate vicinity. Security lighting at an O&M facility and a project substation would have minimal impact on the nighttime visual environment if it were tied to motion sensors. Blade glint or glare from sunlight reflecting off moving blades could possibly be an annoyance to eastbound drivers on I-90 late in the day.

### **Alternative 3: Wild Horse Wind Power Project**

Large earth moving equipment, trucks, cranes, and other heavy equipment will be highly evident features in views toward the project site from nearby areas. At some times, small, localized clouds of dust created by road-building and other grading activities may be visible at the site.

Close-at-hand views, limited to those from nearby segments of Vantage Highway, of activities will be moderately to highly visible and will have a moderate level of visual impact. However, these impacts will be temporary due to the short-term nature of construction.

The units with the greatest numbers of viewers with middleground views of the project site, (i.e. the areas to the south and west), are areas in which construction activities will not be visible because they will be hidden behind the ridgeline formed by Whiskey Dick Mountain. From vantages with background views of the site, the visual effects will be relatively minor and will have little or no impact on the quality of views.

The greatest visual change would be in views of the site from lands to the immediate west, north, and east, where up to 100 turbines would be visible on the high-elevation plateau north of Whiskey Dick Mountain. The overall visual impact in these areas would be moderate, however, because of the low numbers of viewers. Moderate visual impacts would also be created in views toward the project from Vantage Highway and from the rural residential areas at the eastern end of Kittitas Valley. From the community of Kittitas and the areas around it, and from the areas east of the Columbia River, the project would appear as elements in the distant landscape and would have relatively little impact on the overall quality of the view. The PSE interconnect substation would be visible from I-90 and nearby areas, but would be visually consistent with existing infrastructure in the vicinity and would have a relatively low impact on existing visual conditions.

### **Alternative 4: Desert Claim Wind Power Project**

Visual changes associated with construction and operation of the Desert Claim Wind Power Project would have temporary but moderate visual impacts on nearby residences and roads. During construction (approximately 9 months), equipment, clouds of dust, and exposed soils would create temporary visual impacts.

The methods used to analyze visual impacts associated with the Desert Claim alternative differ from those used for either the KVVPP or the Wild Horse alternative, with visual assessment

units containing varying numbers of viewpoints used in place of specific viewpoints. These units include the Northwest Valley Floor with 5 viewpoints, the Northeast Valley Floor with 3 viewpoints, the greater Ellensburg area with 3 viewpoints, and the Yakima River, Southwest Valley Floor, Hayward Hill, Dry Creek Slope and Table Mountain Slope areas with 1 viewpoint each.

Under this alternative, visual impacts would be greatest for the Northwest Valley Floor unit, with high level impacts from 2 viewpoints, moderate level impacts from 2 viewpoints, and low level impacts from the remaining viewpoint. Of the remaining units, this alternative would have moderate level impacts to one of three viewpoints in the greater Ellensburg unit and to the Hayward Hill and Table Mountain slope units. The remaining viewpoints would all experience low level impacts.

Visual impacts from this alternative are likely to be less than the KVVPP or the Wild Horse alternative due to it not being visible from the Columbia River Gorge as compared to the Wild Horse, and greater distance from major transportation routes such as I-90 and US-97 and fewer residences in close proximity than the Kittitas Valley site.

Impacts from light and glare under the Desert Claim alternative would be similar to those described for the KVVPP primarily due to closer proximity to residences than the other alternatives. Wind turbines along the perimeter of this alternative would have dual lighting systems to meet FAA safety requirements. As described for Kittitas Valley, white lights flashing during the day are expected to be noticeable but have a low level impact while red lights flashing at night would be noticeable from roads and residences and could have a high level impact on views in the project area. Residences in the Northwest Valley and Table Mountain slope assessment units would experience the greatest impact. Night lighting of turbines and other facilities would also contribute to increased night lighting in the project area.

Blade glare or glint may also occur occasionally, and this can be seen over distances of 6 to 9 miles.

### **3.10 TRANSPORTATION**

#### **3.10.1 Affected Environment**

##### **Kittitas Valley Wind Power Project**

Roadway segments included in the traffic analysis for the Kittitas Valley site include I-90 west of US 97; US 97 north of I-90; US 97 south of Bettas Road; Bettas Road; and Hayward Road. All of these road segments currently have PM peak-hour volumes that are well below the hourly design capacity of the road segment and PM peak hour LOS is B for I-90 west of US 97; C for both segments of US 97; and A for both Bettas and Hayward Roads.

Accident rates, expressed as the number of accidents per million vehicle miles, were calculated for the I-90 and US 97 road segments and are lower than the statewide average for these road types.

Future plans and projects within the Kittitas Valley site analysis area include paving of US 97 between Virden and Ellensburg and paving of I-90 between Gold Creek and Easton Hill, both of which are scheduled to occur in 2004.

##### **Alternative 1: Swauk Valley Ranch**

Major roadways in the area include SR 970, SR 10, and I-90. Several roads maintained by Kittitas County, as well as private roads, are located in the project area. A series of rough access roads cross the site. Existing LOS and accident rates have not been calculated for this alternative but would be similar to those described for the Springwood Ranch alternative.

Given the proximity of the Swauk Valley Ranch alternative to the KVVPP (within the same county and general area), roadway limitations, local comprehensive travel plans, public transportation, air traffic, rail traffic, and waterborne traffic would all be similar to the KVVPP.

##### **Alternative 2: Springwood Ranch**

I-90, SR 10, Thorp Prairie Road, and the Thorp Highway serve the Springwood Ranch area. Primary access to the site would be from I-90 at the Elk Heights interchange at MP 94. The Elk Heights interchange provides access to Thorp Prairie Road, which is adjacent to the west side of the site, and Taneum Road, immediately south of the site. Existing traffic volumes at the interchange are extremely low. The intersection of Elk Heights Road and Thorp Prairie Road, adjacent to the intersection, is estimated to serve approximately 10 vehicles during the PM peak hour. Neither existing LOS or accident rates have been calculated for this alternative, although existing LOS and accident rates are expected to be as described for the Kittitas Valley site for I-90 and LOS is expected to be high and accident rates are expected to be low on local roads in the project area due to low traffic volumes.

Stop signs are the traffic controls at the I-90 ramps for Elk Heights Road. A stop sign is also located at the intersection of Thorp Prairie Road and Elk Heights Road. The roads adjacent to Springwood Ranch serve existing farms and ranches. Counts taken in 1999 indicate that traffic

volumes at these intersections are very low, with weekday afternoon volumes of five or fewer vehicles (Kittitas County, 1999), and conditions have not changed significantly in the past few years.

The eastern edge of the Springwood Ranch site is located 8 miles northwest of Bowers Field. The project site underlies low-altitude airways used by aircraft flying over Kittitas County. Aircraft traveling to and from Bowers Field under instrument flight rules typically would not fly over or near the Springwood Ranch site. The Cle Elum Municipal Airport and DeVere Field are located approximately 7 miles and 5 miles (respectively) from the northwestern corner of the Springwood Ranch site. Any protected airspace would not overlap with the Springwood Ranch project area.

Given the proximity of the Springwood Ranch alternative to the KVVPP (within the same county and general area), roadway limitations, local comprehensive travel plans, public transportation, air traffic, rail traffic, and waterborne traffic would all be similar to the KVVPP.

### **Alternative 3: Wild Horse Wind Power Project**

The Wild Horse site is located in a rural area with low population density to the northeast of the town of Kittitas. Access to the project site itself is by gravel roads that are privately owned and not open to general public access. Key transportation routes in the vicinity include I-90, approximately 4 miles to the south of the site; the Old Vantage Highway, a County road located 2 miles to the south; and No. 81 Road, a County road that extends north from Kittitas to the Old Vantage Highway. I-90 interchanges nearest the site are located at Kittitas (approximately 10 miles to the west) and Vantage (9 miles east).

Traffic volumes on this segment of I-90 are approximately 15,000 vehicles per day, somewhat lower than for the area west of Ellensburg. The ADT volume for the Old Vantage Highway ranges from approximately 1,100 to 1,500, depending on location. The major roadways in the vicinity of the Wild Horse site currently operate at LOS C or better.

Baseline conditions with respect to air transportation for the Wild Horse site are, in general, the same as or very similar to those described below for the Desert Claim project area. The primary difference between the sites concerns their geographic relationship to Bowers Field and air traffic using that facility.

The western edge of the Wild Horse site is located 13 miles due east of Bowers Field. Ground elevations within the site range from approximately 2,700 to 3,700 feet above sea level, or 1,000 to 2,000 feet higher than Bowers Field. The Wild Horse site underlies several low-altitude airways used by aircraft flying over Kittitas County, as discussed below for the Desert Claim site. Similarly, aircraft traveling to Bowers Field under instrument flight rules typically fly over or near the Wild Horse site on approach to Runways 29 and 25. Aircraft departing Bowers Field under instrument flight rules would make turns to the south, southwest or northeast, and would not over fly the Wild Horse site as a part of the departure procedure. The airspace protected under the existing left-hand VFR traffic pattern extends 4 miles to the east from Bowers Field, and therefore ends approximately 9 miles from the Wild Horse site. Bowers Field is the closest public airport to the Wild Horse site. The JKD Farms private airfield is located approximately 8

miles to the southwest of the Wild Horse site. There is no protected airspace associated with this facility. The FAA standards for marking and lighting tall structures would also apply to the Wild Horse project.

#### **Alternative 4: Desert Claim Wind Power Project**

The Desert Claim project area is served by a discontinuous system of two-lane county roads. Traffic volumes on county roads within the project area are relatively low and well within the capacity of the road network. Roads included in the traffic analysis for this alternative include I-90, US 97, Smithson Road, Reecer Creek Road, Wilson Creek Road, and Hungry Junction road. Existing LOS was calculated only for local roads under this alternative and all have a current LOS of A. Accident rates have not been calculated for this alternative, however they would be expected to be as described for the Wild Horse and Kittitas Valley alternatives for I-90 and US 97 and relatively low on local roads due to low traffic volumes on these roads.

Given the proximity of the Desert Claim alternative to the KVVPP (within the same county and general area), roadway limitations, local comprehensive travel plans, public transportation, air traffic, rail traffic, and waterborne traffic would all be similar to the KVVPP.

The Kittitas County Airport (Bowers Field) is located to the south of the Desert Claim alternative site and there is a potential for conflict between the use of the airspace for this airfield and the location of the turbines under this Alternative.

### **3.10.2 Impacts of Proposed Action and Alternatives**

#### **Kittitas Valley Wind Power Project**

Project construction would take approximately 1 year. It is anticipated that most of the employees would travel to the site from within a 75-mile radius. Construction traffic would utilize primarily U.S. 97, I-90, and the Kittitas County road network. The total number of vehicles during the construction peak would be 180 (160 vehicles for worker traffic and 20 vehicles for light-duty delivery). Construction traffic would result in an increase in total PM peak volumes on all road segments, and would be least noticeable on I-90 where it would increase by less than 200; would more than double for both segments of US 97; and would increase 100 fold on Bettas and Hayward Roads. The LOS for I-90 and US 97 south of Bettas Road would not change but it would go from C to D for US 97 north of I-90 and from A to B for both Bettas and Hayward Roads during construction. Construction traffic impacts would be mitigated with appropriate traffic-control procedures approved by WSDOT. Construction-related parking would be located at the O&M facility and along the site access roads. Three temporary project access points from U.S. 97 would be established. An approved Transportation Management Plan would include measures to minimize impacts of construction-related traffic.

Wind turbine components would need to be transported along state highways from a larger metropolitan area such as Seattle. Trucks delivering construction equipment and materials to the project site would exceed the WSDOT legal load limit, requiring special permits to be issued for vehicles exceeding the state's maximum size, weight, and load limits. Proper road signs and

traffic management procedures would be utilized to prevent traffic disruptions from construction activities and slow or oversized, wide truckloads.

Increases in traffic could result in an increase in the accident rate on roads in the project area. This would be minimized through implementation of an approved Transportation Management Plan.

Project operations and maintenance could generate up to 40 workers commuting to and from the O&M facility on paved state and county roads during a 24-hour period. This is not expected to affect LOS on roads in the project area. Employees would park at the O&M facility parking lot, with no more than 25 vehicles parked at the facility at any one time. The proposed O&M facility parking lot may not be sufficient to accommodate future parking needs of both project employees and potential visiting tourists. The project applicant would be responsible for maintenance of turbine access roads, access ways, and other roads built to construct and operate the project. There would be no public access to project facilities on privately owned land during construction, operations, and maintenance.

### **Alternative 1: Swauk Valley Ranch**

Construction traffic impacts would be similar to those described for the Springwood Ranch alternative. Most construction traffic would travel to the site using I-90, SR 10, and the Kittitas County road network. Construction-related parking would be located at an appropriate, designated area or along site access roads. Temporary access points from State or County roads may need to be established. A Transportation Management Plan would be prepared to minimize impacts of construction-related traffic.

Wind turbine components would need to be transported along state highways from a larger metropolitan area such as Seattle. Trucks delivering construction equipment and materials to the project site would exceed the WSDOT legal load limit, requiring special permits to be issued for vehicles exceeding the state's maximum size, weight, and load limits. Proper road signs and traffic management procedures would be utilized to prevent traffic disruptions from construction activities and slow or oversized, wide truckloads.

Trips generated by on-site workers present during operation would not affect the existing level of service at local intersections. The wind towers would be closer to I-90 compared to the Kittitas Valley, and Desert Claim and Wild Horse alternatives, and it is anticipated that some travelers on I-90 would leave the freeway to take a closer look at the facility. A site-specific plan to accommodate this activity would need to be developed as part of the Transportation Management Plan for this alternative.

A detailed evaluation of potential airspace conflicts has not been completed for the Swauk Valley Ranch alternative.

### **Alternative 2: Springwood Ranch**

Due to the very low existing traffic volumes, the traffic generated by construction would not affect level of service on local roads in the project area and there would be few opportunities for

slow-moving trucks delivering turbine components to delay local traffic. Potential impacts of construction include degradation of the road surface caused by trucks delivering tower components. In addition, the delivery of turbine components might be difficult due to the physical constrictions of the Elk Heights interchange and the adjacent intersection of Elk Heights Road and Thorp Prairie Road. The Thorp Prairie Road has numerous horizontal and vertical curves that might be problematic for transporters with low clearances. Increases in traffic could result in an increase in accidents in the project area. These issues would be addressed in a Transportation Management Plan prepared for the project.

Trips generated by on-site workers present during operation would not affect the existing level of service at local intersections. The wind towers would be closer to I-90 compared to the Kittitas Valley site and the Wild Horse and Desert Claim alternatives, and it is anticipated that some travelers on I-90 would leave the freeway to take a closer look at the facility. In order to avoid tourists making U-turns on county roads with narrow or no shoulders, it would be necessary to construct a turnaround and small off-road parking area at a suitable viewpoint on Thorp Prairie Road where interpretive information could be included.

A detailed evaluation of potential airspace conflicts has not been completed. However, based on the locations, it does not appear that a wind energy project at the Springwood Ranch site would interfere with air traffic or airspace at either Bowers Field or the Cle Elum Municipal Airport.

### **Alternative 3: Wild Horse Wind Power Project**

Potential short-term impacts resulting from the construction of access roads include potential delays or detours necessitated by construction activities on or adjacent to county roads. Construction activities could require temporary road modifications to accommodate trucks transporting tower components; damage to road surfaces from transport of components or construction materials; and potential interruptions to general traffic flow resulting from detours or delays.

The combined effects of project construction traffic would be minimal and would not cause a change in the level of service on existing public roads near the project.

Project operation would generate a negligible volume of traffic that would not affect existing levels of service on public roads. The level of future tourist activity and traffic cannot be specifically predicted, but could be safely accommodated with signage, off-road parking and viewing opportunities, and vehicle maneuvering space.

Because the project would be further from I-90 it is anticipated that relatively few travelers would leave the freeway to take a close look at the facility.

The Wild Horse project would not have any adverse impacts on the air transportation patterns at Bowers Field. The FAA standards for marking and lighting tall structures would also apply to the Wild Horse project.



#### **Alternative 4: Desert Claim Wind Power Project**

Potential construction impacts include additional traffic generated by construction workers, delivery of construction materials, and transport of wind turbine components that would be assembled on-site. Potential short-term impacts resulting from the construction of access roads would be potential delays or detours necessitated by construction activities on or adjacent to county roads. Under this alternative, construction traffic is expected to result in an increase in PM peak traffic of 80 trips which would not alter the level of service on roads in the project area. This impact would be less than described for the Kittitas Valley site. Construction related parking would be located on the project site.

Construction activities could also require temporary modifications to intersections of county roads to accommodate trucks transporting tower components, and damage to road surfaces may result from transport of components or construction materials. Construction traffic impacts should be mitigated through the development and approval of a construction Traffic Management Plan that would address transportation and access concerns during the construction period.

The traffic directly associated with project operations and maintenance would not impact existing levels of service on public roads in the project vicinity. Additional trips generated by service and supply deliveries would be occasional and negligible in volume.

Some of the proposed turbine locations within the Desert Claim project area would conflict with the protected airspace associated with the existing visual-flight-rules (VFR) traffic pattern, although the conflict involves operation by a category of aircraft that use Bowers Field on a very rare basis. The airspace conflict could be resolved, and the potential operations impact could be avoided by modifying the project plan to remove or relocate turbines and/or to install smaller turbines in selected locations or changing the airport operating procedures to employ a right-hand VFR traffic pattern for two of the four runways at Bowers Field.

## **3.11 AIR QUALITY**

### **3.11.1 Affected Environment**

Climate and wind conditions apply similarly to the KVVPP and the four off-site alternatives considered below.

Kittitas County is not currently designated as a non-attainment area for any air pollutants, so it has a status of “Unclassified, which for regulatory and permitting purposes is equivalent to “Attainment”. The ambient air quality in the project area meets both the National and Washington Ambient Air Quality Standards (NAAQS/WAAQS).

Existing land uses within the Kittitas Valley project area are primarily grazing, rangeland, and low-density residential development. The most prevalent sources of air pollution in Kittitas County are fugitive dust and vehicle emissions, which are associated with agricultural activities, vehicle travel on dirt roads, construction, and other such activities that disturb soils and utilize combustion engines.

#### **Kittitas Valley Wind Power Project**

The KVVPP is located approximately 12 miles north west of Ellensburg. Air quality conditions at the KVVPP site are similar to the general conditions in Kittitas County described above. Existing land uses within the Kittitas Valley project area are primarily grazing, rangeland, and low-density residential development; therefore, sources of existing air pollutants in the project area are primarily vehicle emissions.

#### **Alternative 1: Swauk Valley Ranch**

The Swauk Valley Ranch alternative is located approximately 6 miles southeast of the Kittitas Valley site, 2 miles south of the Desert Claim alternative site, and is directly adjacent and to the northwest of the Springwood Ranch alternative site. Existing air quality conditions for the Swauk Valley Ranch alternative are expected to be similar to those for the Kittitas Valley project area, since these apply generally to Kittitas County. Existing levels of vehicle emissions may be higher in this area due to its close proximity to Interstate 90.

#### **Alternative 2: Springwood Ranch**

The Springwood Ranch alternative is located approximately 7 miles southeast of the Kittitas Valley site and 3 miles south of the Desert Claim alternative site. Existing air quality conditions for the Springwood Ranch alternative are expected to be similar to those described above for the Wild Horse alternative, since these apply generally to Kittitas County. Existing levels of vehicle emissions may be higher in this area due to its close proximity to Interstate 90.

### **Alternative 3: Wild Horse Wind Power Project**

The Wild Horse project is located approximately 21 miles southeast of the Kittitas Valley Site. Existing air quality conditions for the Wild Horse project are expected to be similar to those described above for Kittitas County. With a low population density and rural nature, existing sources of air pollution within the Wild Horse alternative site are primarily fugitive dust and vehicle emissions produced by agricultural activities, vehicular travel on dirt roads, construction, and other light industrial activities that disturb the soils and utilize combustion engines.

### **Alternative 4: Desert Claim Wind Power Project**

The Desert Claim alternative is located in close proximity (approximately 1.6 miles east-southeast) to the Kittitas Valley site at its nearest point. Existing air quality conditions for the Desert Claim alternative site are expected to be similar to those for the KVVPP, since these apply generally to Kittitas County.

With a sparse population and rural nature, existing sources of air pollution within the Desert Claim alternative site are primarily fugitive dust and vehicle emissions produced by agricultural activities, vehicular travel on dirt roads, construction, and other light industrial activities that disturb the soils and utilize combustion engines.

## **3.11.2 Impacts of Proposed Action and Alternatives**

### **Kittitas Valley Wind Power Project**

Construction of the KVVPP would result in air pollution impacts generated by emissions from vehicle and equipment exhaust and fugitive dust particles from travel on paved and unpaved surfaces. Vehicle and equipment emissions would be temporary and limited to the immediate area surrounding the construction site. The magnitude of dust impacts would depend on the number of vehicles operated during construction and the distance over which transportation occurs. Dust emissions would also be associated with land clearing, ground excavation, and cut-and-fill operations. Project construction would produce limited odors from diesel equipment and vehicle exhaust; however, these impacts would occur over a short duration within the alternative site and would not result in adverse effects to regional air quality. With application of the standard control measures typically used in large construction projects, air quality impacts during construction would be insignificant.

Operation of the KVVPP would not result in significant air quality impacts, as it does not involve the combustion of fossil fuels to generate electricity. Project operations and maintenance activities would produce limited air pollutants related to vehicle emissions and fugitive dust. However, these impacts would be minimized through implementation of standard control measures and would not cause adverse effects to regional air quality.

### **Alternative 1: Swauk Valley Ranch**

Impacts of the Swauk Valley Ranch alternative would be similar to those described for the KVVPP due to the similarities in construction, operations, and maintenance activities associated with the proposed projects.

### **Alternative 2: Springwood Ranch**

Impacts of the Springwood Ranch alternative would be similar to those described for the KVVPP due to the similarities in construction, operations, and maintenance activities associated with the proposed projects.

### **Alternative 3: Wild Horse Wind Power Project**

Impacts of the Wild Horse Wind Power Project would be similar to those described for the KVVPP due to the similarities in construction, operations, and maintenance activities associated with the proposed projects.

### **Alternative 4: Desert Claim Wind Power Project**

Impacts of the Desert Claim alternative would be similar to those described for KVVPP due to the similarities in construction, operations, and maintenance activities associated with the proposed projects.

## **3.12 NOISE**

### **3.12.1 Affected Environment**

#### **Kittitas Valley Wind Power Project**

Noise-sensitive areas in the project vicinity include Class A and Class C EDNA. The study area for project-related noise impact analysis included all areas where residents have the potential to hear construction or operational noise from the project. There are approximately 60 residential structures within 1 mile of the proposed wind turbine strings. The primary source of existing noise in the project area is wind and vehicular traffic on U.S. 97.

#### **Alternative 1: Swauk Valley Ranch**

Noise-sensitive areas in the project vicinity include Class A and Class C EDNA. The study area for project-related noise impact analysis included all areas where residents have the potential to hear construction or operational noise from the project. There are approximately 60 residential structures within 1 mile of the proposed wind turbine strings, mostly downslope along the Yakima River and south of the project site. The primary source of existing noise in the project area is wind and vehicular traffic on SR-10.

#### **Alternative 2: Springwood Ranch**

Existing sound levels in the vicinity of the Springwood Ranch site have not been measured. However, given the existing low-density land uses in the area, it is likely that the predominant sound source in the southern portion of the site is Interstate 90, and that farther from the freeway the sound levels are relatively low. Operation of agricultural equipment on the ranch and in nearby areas likely creates intermittent, localized noise. Potentially sensitive receivers for this alternative include scattered developed sites near Taneum Creek to the south of the site; nearby residences to the east along the Thorp Highway and school and residential uses within the nearby community of Thorp; and the Sunlight Waters residential/recreational community near the northwest corner of the site. The potential receivers in Thorp and Sunlight Waters would be classified as Class A EDNAs, while those in the rural areas would be classified as Class C EDNAs.

#### **Alternative 3: Wild Horse Wind Power Project**

Wild Horse site is located in a rural area with a low population density. The closest distance between a residence and a wind turbine location is over 2 miles. The Wild Horse site and the prospective interconnect points lie on privately owned land. Grazing is the predominant existing use of the site, and existing sources of human-caused noise are minimal. On-site sound monitoring data have not been collected, but the existing sound environment is likely to be quite quiet, and similar to levels encountered at the KVVPP site.

#### **Alternative 4: Desert Claim Wind Power Project**

Noise-sensitive areas in the project vicinity include Class A and Class C EDNA. The predominant sources of existing noise on and near the project site include agricultural activities, traffic on local roadways, and occasional overhead aircraft (including helicopters.) At some locations, wind at higher speeds is also a major source of noise.

### **3.12.2 Impacts of Proposed Action and Alternatives**

#### **Kittitas Valley Wind Power Project**

Noise generated by construction equipment is expected to vary, depending on the construction phase, but would not be expected to substantially impair nearby residential land uses. Temporary blasting noise impacts would be associated with construction of the wind turbines. Construction vehicles traveling on local roadways and other nearby roads would temporarily increase noise levels.

Modeling of the KKWPP indicated the potential for noise impacts. Noise modeling results for the middle scenario indicate that noise levels would be below the most restrictive nighttime regulation of 50 dBA at structure and property lines. Changes in background noise levels at numerous other homes could be perceived as adverse depending on the magnitude of that change and the nature of the receptor. Minor increases in traffic along U.S. 97 and project access roads during project operations would not be expected to generate substantial adverse noise effects. The project would not result in any significant impacts from ground borne vibration.

Noise emissions resulting from decommissioning would be expected to be similar to, or lower than, noise levels encountered during construction.

#### **Alternative 1: Swauk Valley Ranch**

Noise generated by construction equipment is expected to vary, depending on the construction phase, but would not be expected to substantially impair nearby residential land uses. Temporary blasting noise impacts would be associated with construction of the wind turbines. Construction vehicles traveling on local roadways and other nearby roads would temporarily increase noise levels.

Noise modeling for a hypothetical wind generation facility has not been performed for this alternative. Based on the modeled noise levels for projects under review by EFSEC or the County, it is possible that noise levels during project operations could exceed regulatory thresholds, depending on the distance between turbine strings and residences. Changes in background noise levels could be perceived as adverse depending on the magnitude of that change and the nature of the receptor. Minor increases in traffic along U.S. 97 and project access roads during project operations would not be expected to generate substantial adverse noise effects. The project would not result in any significant impacts from ground borne vibration.

Noise emissions resulting from decommissioning would be expected to be similar to, or lower than, noise levels encountered during construction.

### **Alternative 2: Springwood Ranch**

Noise generated by construction equipment is expected to vary, depending on the construction phase, but would not be expected to substantially impair nearby residential land uses. Temporary blasting noise impacts would be associated with construction of the wind turbines. Construction vehicles traveling on local roadways and other nearby roads would temporarily increase noise levels.

Several residences are within approximately 500 feet of one or two turbine locations in the northwestern corner of the Springwood Ranch layout. The closest residences could be subject to operational noise in excess of the 50-dBA limit, and/or noise level increases of about 10 dBA. It is possible that the proposed project might result in significant noise impacts to these residences unless the turbines in question were relocated or eliminated.

Noise emissions resulting from decommissioning would be expected to be similar to, or lower than, noise levels encountered during construction.

### **Alternative 3: Wild Horse Wind Power Project**

No noise impacts are expected from the construction of the project. The nearest residence is over 2 miles away from the project site and over 3 miles from the closest rock quarry. Noise generated by construction traffic is unlikely to cause any adverse impact. Commute vehicles and up to 49 heavy trucks per hour would cause traffic noise levels to exceed FHWA impact thresholds only at homes within 60 feet of the street centerline.

No noise impacts are expected from the operation and maintenance of the project. Noise from wind turbines, transmission lines, traffic, and vibration effects are expected to be less than background at the nearest resident.

Noise emissions resulting from decommissioning would be expected to be similar to, or lower than, noise levels encountered during construction.

### **Alternative 4: Desert Claim Wind Power Project**

During construction, there would be temporary increases in sound levels near active areas of construction and along roadways used for construction vehicles, depending on the type of equipment being used and the amount of time it is in use.

Predicted operational noise levels at all receptor locations would meet applicable noise limits. Based on Noise level and/or increase over ambient levels, project noise impacts would be rated either low or medium, and would not be significant.

Noise emissions resulting from decommissioning would be expected to be similar to, or lower than, noise levels encountered during construction.

### **3.13 PUBLIC SERVICES AND UTILITIES**

#### **3.13.1 Affected Environment**

##### **Kittitas Valley Wind Power Project**

Structural fires, vehicle fires, and wildland fires, primarily human-caused, are the most frequently occurring fires in the area. Three fire districts are in the project area: Fire District No. 1 (Rural Thorp), Fire District No. 2 (Rural Ellensburg), and Fire District No. 7 (Cle Elum). The City of Ellensburg has its own fire department. DNR provides fire protection on the properties it manages. Approximately 80% of the project site is not contained in any of the fire districts. Current response times to the project site depend on a variety of factors, including wind speed. DNR estimates it could reach the project site by helicopter in 10 to 15 minutes.

Law enforcement is provided in the project vicinity by the Kittitas County Sheriff's Department and the State Patrol.

The City of Ellensburg fire department provides EMS for the entire county. Ambulances are located at Ellensburg and the towns of Kittitas and Cle Elum. Cascade Search and Rescue is located in Ellensburg. Kittitas County Community Hospital in Ellensburg serves the entire county.

Ellensburg School District 401 serves the general project area. Enrollment for the 2001-2002, grades K-12, was 2,833 students (Economic Opportunity Institute, 2003). Surrounding school districts include Kittitas School District 403 and Thorpe School District 400.

Wastewater services are typically provided by septic systems. Water supply in the project area is provided by wells. Two transfer stations provide solid waste collection services in the project area. The county's only municipal landfill is the Ryegrass Landfill is also available to accept inert waste.

##### **Alternative 1: Swauk Valley Ranch**

Local fire districts, the U.S. Forest Service, and WDNR provide fire protection in the project area. Primary law enforcement services to unincorporated areas of Kittitas County and traffic law enforcement are as described for the Proposed Action. The City of Ellensburg fire department provides EMS for the entire county. School attendance would be similar to that described for the Springwood Ranch alternative since population density is low. Water supply in the project area is provided by on-site wells and wastewater is treated by septic tanks. Transfer stations and a municipal landfill provide solid waste collection services in the project area.

##### **Alternative 2: Springwood Ranch**

Springwood Ranch is located within the service territory of Kittitas County Fire District 1, which has facilities located in the unincorporated communities of Thorp and the Sunlight Waters development. District 1 has an all-volunteer force that is backed up by Fire District 2 in



Ellensburg that provides additional response capabilities for larger fires. Wildland and brush/grass fire response services are provided by the U.S. Forest Service and WDNR.

Law enforcement services for the Springwood Ranch area are as described for the Proposed Action. The Thorp School District 400 serves grades K through 12 from facilities located in the unincorporated community of Thorp. Enrollment for 1997–1998 was reported at 189 students (Public Sector Information, Inc., 1998). Kittitas Valley Community Hospital District 1, which is located in Ellensburg, provides hospital and emergency room service to the Springwood Ranch site as well as hospital services Countywide.

Due to close proximity, utility systems and services (water supply, stormwater, sewer, solid waste, energy and communications) for the Springwood Ranch area are generally the same as described for the Kittitas Valley and Desert Claim alternatives.

### **Alternative 3: Wild Horse Wind Power Project**

The site is not located within the existing boundaries of any of the rural fire districts serving Kittitas County. The U.S. Forest Service and the Washington Department of Natural Resources provide wildland and brush fire suppression services on a county-wide basis and are the primary providers of fire services within the vicinity of the Wild Horse site.

The Ellensburg Fire Department provides emergency medical service to the eastern part of the County, while the Kittitas Valley Community Hospital provides hospital service. The Kittitas County Sheriff's Department is the primary source of law enforcement services for the Wild Horse site and other unincorporated areas in the County.

The Wild Horse site is within the service boundaries of the Kittitas School District 403. District 403 has a current enrollment reported at 516 students.

There are no public water supply, stormwater or sewer systems serving the Wild Horse site or adjacent areas. Residential and agricultural users in the project vicinity obtain water and sewer service from individual wells and on-site sewage disposal systems. Waste Management of Ellensburg provides contracted solid waste collection services to residents living near the Wild Horse site, and Kittitas County PUD provides electrical service. The Wild Horse site is within the service territory of the Ellensburg Telephone Company.

### **Alternative 4: Desert Claim Wind Power Project**

The Desert Claim site is situated outside the existing boundaries of local rural fire districts that serve Kittitas County. The U.S. Forest Service and the Washington Department of Natural Resources provide wildland and brush fire suppression services on a countywide basis and are the primary providers of fire services within the vicinity of the site.

Primary law enforcement services to unincorporated areas of Kittitas County and traffic law enforcement are as described for the KVVWPP. Ellensburg School District 401 serves the general project area. Enrollment for the 2001-2002, grades K-12, was 2,833 students (EOI, 2003). Surrounding school districts include Kittitas School District 403 and Thorpe School District 400.

Water supply, stormwater, and community sewer systems are not located in the project area. Irrigation water used in the area is provided by domestic wells. Services to dispose of solid waste are similar to that described for the Proposed Action.

The Ellensburg Fire Department provides emergency medical service to the eastern part of the County, while the Kittitas Valley Community Hospital provides hospital service. Ellensburg Telephone Company provides telephone service to the project area and vicinity.

### **3.13.2 Impacts of Proposed Action and Alternatives**

#### **Kittitas Valley Wind Power Project**

Project construction could temporarily increase the risk of fire at the project site and in the broader project area. Fire hazards could be slightly higher at the Kittitas Valley site due to poor access along a portion of Hayward Hill Road that could hinder responders. Construction activities could result in additional calls for law enforcement agencies for traffic and accident related events, theft, or vandalism.

Impacts to schools are not anticipated during the construction phase under the Proposed Action. Non-local workers are not expected to relocate their families during the short-term work required for construction. Demand for EMS could increase slightly due to construction related accidents that could occur at the project site or vicinity. Demand on water would increase, with an approximately 2 to 5 million gallons consumed for dust suppression and other construction purposes. The Ryegrass Landfill and Greater Wenatchee Regional Landfill would be impacted slightly by the increased amount of solid waste generated at the KVVPP.

Impacts on local schools, EMS, water supply, wastewater disposal, and communications are expected to be minimal during the operation phase of the project since sufficient capacity exists in the area to meet the demands.

#### **Alternative 1: Swauk Valley Ranch**

Demands on public services, utilities, and recreational facilities would be similar to, but likely less than, those described for the Proposed Action and the other alternatives due to its small size. Construction activities could potentially result in additional calls for fire response and law enforcement. As with any construction site, the demand for EMS could increase due to the potential for construction related accidents.

Project-related demands on schools, water supply, sewer and solid waste disposal, recreational parks, and communication services would also be less than those described for the Proposed Action.

#### **Alternative 2: Springwood Ranch**

Impacts of the Springwood Ranch Alternative on public services, utilities, and recreation would be similar to those described for the Proposed Action. Potential needs for fire service during

construction and operation would likely be addressed by a service contract with Fire District 1, based in Thorp.

It is anticipated that project-related demands for police, education, solid waste disposal, and communications services would be limited or minimal on existing service systems. Needs for water supply, stormwater management, and sewer service would be addressed internally through project construction and operation plans and would have minimal impacts on existing delivery systems for those utility services.

### **Alternative 3: Wild Horse Wind Power Project**

Construction activities could result in increased calls for fire and emergency medical services. Potential needs for fire service during construction and operation would likely result in the execution of a service contract with a rural fire district (either Fire District 2, based in Ellensburg, or Fire District 4 in Vantage).

During operations, impacts to fire and emergency medical services would not be significant. Current Fire District No. 2 resources would be sufficient to provide fire suppression services to the project area, although staff is not trained for high-angle rescues.

Project-related demands for police would be minimal and no significant adverse impacts on existing services would be expected. No significant impacts on local schools are anticipated during construction or operation. No significant impacts would occur to public water supply, stormwater facilities or sewer disposal facilities. No impacts are anticipated on solid waste disposal facilities in Kittitas County.

### **Alternative 4: Desert Claim Wind Power Project**

Calls for fire response to the project area could increase during construction and would be similar to those described for the Proposed Action. Site clearing, road building, and construction of the wind turbines and transmission system could contribute to an increased risk of accidental fire.

The Desert Claim Alternative is not expected to have more than a slight potential increase in the demand for law enforcement over existing conditions. Impacts on local schools would be the same as that described for the Proposed Action. Impacts to recreational resources and opportunities would be very low or negligible, generally limited to some temporary audible and visual intrusion and congestion along roadways. Impacts to public water supply, stormwater, and sewer services are not anticipated since these services are not available on-site. It is also anticipated that the local landfills would be able to accommodate the level of solid waste and debris generated by the project.

During operation, impacts to fire and emergency medical services would occur to a lesser extent than those described for the construction period. Few workers, using minimal amounts of machinery, and reduced traffic would account for this lesser impact.